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Caution: CRTs May Be Eye Hazard

By John P. Hebert
Of the CW Staff

There are thousands of people currently using display terminals in this country. Some of them may unavoidably fall asleep doing their jobs — and not because they had one too many the night before.

Eyestrain is the culprit, according to Dr. Jeryl Sparks, a Dallas optometrist who said his office is frequented by Texas Instruments, Inc. and Collins Radio Co. employees who use CRT terminals in their jobs each day.

Although the problems of a loss in

visual clarity and soreness and swelling of the eyes are shared by people in any job requiring "detail" work, a few could be caused by the terminals or the places in which they are found, according to Sparks.

His observations are supported by a study of CRT operators in Europe published by Air France.

As of December 1976, there were 58,000 conversational CRT terminals and 294,500 editing CRTs in use in this country, according to figures published by International Data Corp. in a recent study

on data entry and data communications equipment.

These figures are probably slightly higher now, according to a spokesman for the market research firm. It is unknown, however, how many CRT users actually suffer eye problems.

The elements contributing to eye discomfort could range from the brightly lit air-conditioned offices where the terminals are located to glare from the devices' reflective faceplate and the dot-matrix characters displayed on the screens.

(Continued on Page 6)

COMPUTERWORLD

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President Carter, flanked by privacy commissioners, reaches for report.

Carter Pledges Influence To Develop Privacy Policy

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — President Carter pledged last week to use his "influence as President" to help develop a national policy governing the treatment of personal records in public and private data banks.

The pledge was made at a meeting in the White House Cabinet Room last Tuesday morning with David F. Linowes, chairman of the Privacy Protection Study Commission, and members of his staff. At that meeting, the fruits of the commission's two years of work were formally presented.

Carter agreed to discuss the study with his Cabinet members at a meeting today and ask them to read the commission's 638-page report.

And on Capitol Hill reaction to the report was swift. As many as 11 separate bills were offered to help turn the commission's recommendations into reality.

The Privacy Protection Study Commission was established by the Privacy Act of 1974 to study whether the business community should be required to protect the confidentiality of records they maintain on individuals.

At a joint hearing of the Senate Committee on Governmental Affairs and the House Government Operations Committee's Subcommittee on Government Information and Individual Rights, Rep. Barry M. Goldwater Jr. (R-Calif.) and Rep. Edward I. Koch (D-N.Y.) — both commission members — gave "legislative expression" to the privacy group's recommendations.

This took the form of 10 separate bills that Goldwater said he hoped will "ultimately be incorporated into the Omnibus Privacy Act of 1977."

The bills, designed to provide privacy guidance for the private sector and to clarify the government's role in assuring that privacy, deal with consumer and commercial credit, banking, insurance and medical records, the Social Security num-

(Continued on Page 4)

Firmware Lets Mini Emulate IBM 370

RANDALLSTOWN, Md. — Interdata 7/32 minicomputers can now be outfitted with firmware that allows them to emulate IBM 370 mainframes, according to the developers of the firmware, Kardios Systems Corp.

With the enhancement, the Interdata system can run any of the IBM 370's applications programs, according to the Kardios spokesman.

The company is making the firmware available to present 7/32 users or will offer its own version of a configured 7/32, the Duo 70, complete with the firmware enhancement.

When outfitted with the enhancement, the system can run both Interdata applications programs under the Interdata instruction set and IBM application programs under the IBM instruction sets, the spokesman explained. The firmware can include a Basic Assembly Language (BAL) instruction set, commercial instruction set and a scientific instruction set.

Upgrading from the Interdata 7/32 to the Duo 70 takes about a day, the company noted, and Interdata will maintain the system with the enhancement.

In a job stream, the system will switch

back and forth from applications written under Interdata to those written under IBM. The firmware runs under Interdata's OS/32 MT multitasking operating system, in two distinct operating modes, the spokesman added.

The Duo 70 costs \$15,000 plus the cost of an Interdata 7/32 system configuration

for the enhancement including the BAL instruction set. The commercial instruction sets and scientific sets have not yet been priced, a spokesman noted, but delivery can be 60 days after receipt of order. Kardios Systems Corp. is at 3820 Courtleigh Drive, Randallstown, Md. 21133.

New Yorkers' Systems Hit Hard By Mid-Week Lightning Storm

NEW YORK — Computer systems were hit hard here last week when a lightning bolt knocked out a Consolidated Edison power substation, shutting down the utility's service to 2.7 million customers.

More than 3,300 computer centers were in the affected area, but at press time it was difficult to determine how many had been operating when the power went off at 9:33 p.m. on Wednesday.

But the reliance of business and industry on computer systems and the impact of such systems on the public was evident in the crisis.

With the shutdown last week, for example, all types of reservation systems — from airlines to hotels — were crippled, stranding travelers with and without reservations.

At both the Holiday Inn and the Sheraton Hotels the personnel could not make reservations — or confirm those already made — even at hotels in New Jersey, which was not affected by the outage.

All of those hotels' reservation systems operate through switches in New York and with switches down, reservations were

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IBM Break-Up Seen as Only Solution

By Catherine Arnst

Of the CW Staff

NEW YORK — The only way to remove IBM's monopoly power over the computer industry is through divestiture, according to Dr. Alan K. McAdams, chief economic adviser to the Justice Department's trial team in the U.S. vs. IBM antitrust suit.

That is precisely the remedy the Justice Department plans to recommend if it wins the suit, according to Justice Department attorney Lewis Bernstein.

Without divestiture, there is very little that can be done to prevent further anti-competitive practices by the firm, McAdams testified at the trial recently.

"No institution is capable of monitoring IBM" in a manner that would allow competition to grow because of the complexity of the industry and IBM's ability to take disadvantages and change them into advantages, he added.

"I see no threat to IBM's monopoly position at this time [from existing competitors] ... In order to affect behavior which limits competition you must remove the power that IBM has ... The only mechanism capable of achieving that is to go to the heart of IBM's power — the general-purpose computer systems market," McAdams said.

IBM has been able to maintain its monopoly power because it dominates both the general systems and the plug-compatible peripherals market, the Cornell University economics professor explained. IBM was able to offset losses in one market by raising prices in the other and "the user received no benefits from such market control," he said.

Fixed-Term Lease Plan

Examples he gave included IBM's Fixed-Term Lease Plan (FTP) instituted in May 1971. The FTP offered low rental prices to users who signed on for long-term leases, but it penalized those who canceled before the lease termination date.

The IBM task force that recommended the FTP forecast it would cause a revenue reduction of more than \$75 million in 1971 to 1972. In order to recoup its losses, IBM announced price increases on CPUs and other portions of the system not covered by the FTP in July 1971 (which didn't go into effect until July 1972 because of the price freeze at that time), the prosecution's pretrial brief stated.

A 'Wash'

In August 1971, IBM predicted that "the net effect of the FTP and (CPU) price changes will be a wash insofar as business volumes are concerned," an internal IBM document said.

IBM could also change the interface design of its CPU to undermine competition in the peripherals market — another example McAdams gave of the firm's ability to dominate one market through its dominance of another.

This was a favorite strategy with the 370 systems line, all the components of which IBM originally intended to be fully interchangeable, McAdams testified.

The result of the several changes was "a great proliferation of interfaces" with accompanying inventory control problems for IBM and an undoing of the benefits interchangeability offered users, he said.

Interlocking Strategies

The FTP and the interface changes are two of the interlocking strategies IBM orchestrated to erect barriers to entry into both the general-purpose and the peripherals markets, McAdams said.

He illustrated the effectiveness of these barriers with a case study of General Electric's (GE) attempts to enter the general systems market. A test of whether a market is truly competitive is the ease of both entry and exit, McAdams said.

GE decided to enter the systems market in the late 1950s, and a feasibility study predicted its first break-even year would

be 1976, McAdams said. Before it reached that point, however, the study determined the firm could expect to incur before-tax losses of \$250 million.

The only type of company which could sustain such losses is one that operates in several markets, as GE does, McAdams said. Consequently, the firm, which ranked ninth in the Fortune 500 list, was willing to go head-to-head with IBM on a systems basis, he testified.

GE and IBM development activities paralleled each other, McAdams said. Both attempted to develop a comprehensive time-sharing system data base management system. Both had the same degree of difficulty achieving those goals.

The difference was that IBM showed substantial profits while GE suffered substantial losses.

IBM could use its dominance in the peripherals market to offset its losses in the systems area and was able to "outpromise" GE; when both parties failed, the advantage reverted to IBM, he concluded.

When GE quit the business the user and the industry lost a highly innovative firm that was willing to take risks in its development efforts, McAdams said.

IBM Memo: 'A Smoking Gun'?

By Catherine Arnst

Of the CW Staff

NEW YORK — A 1968 memo indicating IBM was aware actions it was taking could be regarded as anticompetitive was introduced here recently in the government's antitrust case against the firm.

The memorandum, which IBM considered "privileged" and fought to keep out the case for nearly two years, concerned its introduction of the 370/155 — a system the government contends IBM announced to contain any threat a Memorex computer system might possess.

Described as a "smoking gun" by several members of the Justice Department team, the document is one of 14,000 ruled not warranting privilege claims.

The two-paragraph internal memo from the general counsel of IBM's Data Processing Group to the assistant general manager and senior vice-president of that group, dated Sept. 23, 1968, states: "If the [370/155] announcement is in any way accelerated, it is vitally important that no anticompetitive motive be spread in the files.

"I have alerted Mr. Wunderli, Systems Development Division counsel, to handle this with Mr. Branscomb, but it is of even

greater significance that our files be clean."

At the top of the memo is the legend: "privileged communication — to be kept in a segregated file and not to be summarized or reproduced without permission of the law department."

According to testimony by Dr. Alan K. McAdams, the prosecution's head economic advisor, the memo offers one hypothesis of why no IBM analyses of Memorex's general-purpose computer system were available to the government.

IBM had conducted extensive studies of Memorex's entrance into the plug-compatible peripherals market with disk drives that were widely accepted and considered generally superior to IBM products, McAdams testified. This, he indicated, was based on IBM documents previously available to the government, and "I was very surprised no such analyses relating to the Memorex computer system were found," McAdams said.

Memorex's entry into the general-purpose computer systems market "would have been taken very seriously by IBM," making it even more unusual that no analyses of that aspect of a potential competitor's business was found, he added.

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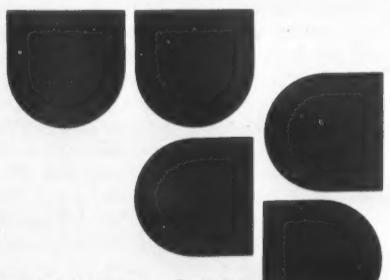
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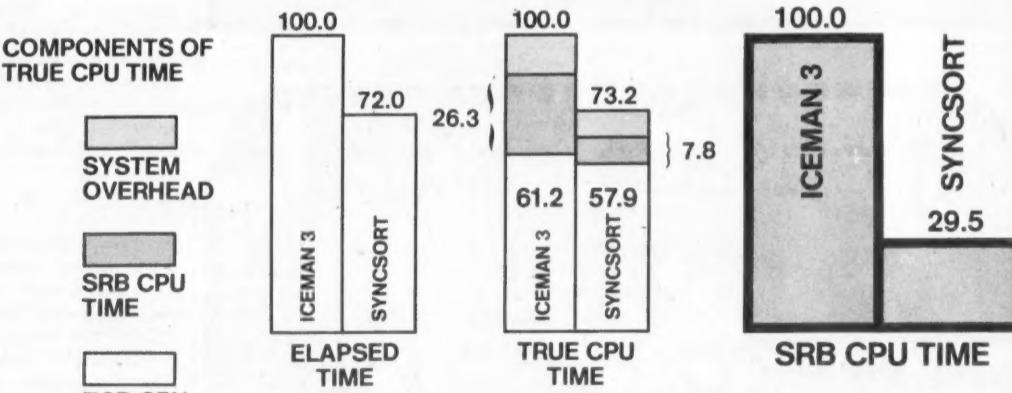
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Privacy Principles Ignore Global Needs

By G. Russell Pipe

Special to Computerworld

AMSTERDAM, The Netherlands — Opponents of strong, comprehensive private-sector privacy legislation may have won a major victory in the U.S., but framers of European privacy laws are likely to be sorely disappointed.

The 600-page privacy study contain-

Analysis

ing scores of policy recommendations appears oblivious to the labors of some 18 countries working on nearly identical issues. Indeed the extensive elaboration of legal reforms needed in personal data practices, tepid as they are, may seem to be a stamp of disapproval of American recordkeeping.

Europeans expected an extension of the Privacy Act of 1974, albeit with modifications, to give blanket coverage over personal records maintained by commercial organizations. Most countries of Scandinavia, Central Europe and the UK are approaching privacy by framing laws of general application, usually a single statute for public and private records. This has become a sine qua non for transfer of data between

countries.

Without common basic rules, such as the Swedish and German laws provide, the U.S. DP industry will have to rely on congressional action in some 14 fields.

Because the commission saw a need for specific recommendations in these areas, European officials are likely to take this as evidence of deficiencies in collection, maintenance, use or dissemination practices which, they believe, must follow their data wherever it is located. Thus, until separate medical, banking, insurance, personnel record and other sectoral laws are enacted, some foreign governments may contend that the absence of protection should result in restricting personal data sent to the U.S.

The scantly detailed Federal Privacy Board proposal would not meet even minimum objectives of most such bodies being considered by other countries. The likelihood that such an American board would meet basic reciprocity requirements is, at most, wishful. Further, since such a board would be limited to monitoring federal agency activities, leaving the private sector unshepherded, a large gap exists in the jurisdiction it would have with European counterparts.

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Carter Pledges Support

(Continued from Page 1)

ber, Internal Revenue Service records, public assistance, social services and government access to personal information.

Not to be outdone, Sen. Birch Bayh (D-Ind.), who chairs the Senate Judiciary Committee's Constitutional Subcommittee, also chose the day the privacy commission's report was released to introduce legislation designed to prevent the indiscriminate use of polygraph tests by government and private enterprise employers. His subcommittee will soon hold hearings on this "Polygraph Control and Civil Liberties Protection Act," Bayh promised.

Sen. Charles H. Percy (R-Ill.) summed up the mood in the Capitol concerning the commission's report when he observed during the hearing that "privacy makes strange bedfellows . . . It is an issue that cuts across ideologies."

Linowes repeatedly expressed his appreciation for the enthusiastic response to the report, entitled "Personal Privacy in an Information Society." He added his hope that that response would be just the beginning of "vigorous and quick action" on the part of the President and the Congress to rectify "some of the systematic problems" identified in the commission's 162 recommendations.

Referring to the Koch-Goldwater bills, Linowes noted that "a single sweeping solution to the privacy problems this nation faces won't do justice to our economy." Accordingly, the report's recommendations and their attendant legislation seeks "to keep clearly in mind" the diversity of the institutions, records and rights of individuals involved.

Tailored to Specific Industries

While privacy laws for each area of the economy will be tailored to specific industries under the commission's plan, certain guiding privacy principles will be found in all this legislation, the chairman added [CW, May 9].

These principles include the right of an individual to see, copy and correct his record and the right to authorize an organization to transfer the information it has about him, Linowes said.

Organizations — public or private — should use personal information only for the purpose for which it was collected, he stated. In addition, they should collect only that information which is relevant to the decision being made.

Organizations would also be expected to put an end to secret records and holding investigative interviews under false pretenses, Linowes stressed.

If these principles are followed, the nation will go a long way toward preventing unwarranted intrusion into an individual's private affairs and keeping inaccurate records from causing unfair decisions about an individual. It should also help protect the individual's interest in disclosures made from records about him, the commission's report stated.

The privacy commission concluded that Congress should not apply the specific requirements of the Privacy Act of 1974 outside the federal government. Instead, Congress and state governments should mandate access and correction rights tailored to particular types of record-keeping relationships as proposed in the Koch-Goldwater bills.

The commission intends, through a mixture of legislation, regulations and voluntary compliance, "to tell society how it expects it to behave and then leave it alone as to the details by which it reaches privacy answers," Commissioner William O. Bailey said.

"We have no desire to bind private institutions into a straightjacket of rules and regulations," the insurance company executive added.

There are only two areas of the private sector in which the commission recommends voluntary compliance with privacy guidelines, however. These are employ-

ment and mailing records, Linowes said.

A "legally enforceable expectation of confidentiality" should be applied to the records that credit grantors, banks, insurance companies and doctors and hospitals maintain about individuals, the commission concluded. Long-distance telephone records should also be covered.

"We aren't saying the government doesn't have a legitimate interest in examining records on an individual in some instances," Linowes noted. "But the individual should have the right to protect that record. The government shouldn't be allowed to conduct a fishing expedition."

The chairman maintained there are "no burdensome costs" in any of the commission's recommendations. While individuals would be able to seek damages for privacy infringements in the commission's scheme, the liability of the record keeper that complies with an individual's request for access to its records about him would also be limited.

"The commission wants organizations to invest in improving their recordkeeping practices, not to spend their money in costly litigation over past practices and honest mistakes," Linowes said.

The recommendation that the President and the Congress consider establishing an independent privacy "entity" to monitor the implementation of the commission's suggestions and to help streamline the federal privacy protection requirements that now apply to government agencies drew considerable comment and several questions from the senators and congressmen.

The commissioners stated they made this recommendation deliberately vague.

"The only message this commission wants to get across is that privacy is a phenomenon that should be dealt with in a centralized fashion," Linowes stated.

Added Bailey: "We've been very specific about the functions this board would have." Among that entity's functions would be advocating privacy, giving the issue "front burner concern," he said.

Commission vice-chairman Dr. Willis H. Ware noted that much has been accomplished in the past two years by the Privacy Protection Study Commission operating with a staff of 25 people. "The entity we have in mind would involve tens of people — not hundreds or thousands," he stated.

In the course of its study, the seven-member commission held 60 days of hearings and meetings and took testimony from more than 300 witnesses including credit-card issuers, banks, department stores, mail-order firms, insurance companies, educational institutions, doctors, hospitals and federal agencies, including the Justice Department and IRS.

New York Systems Hit By Blackout

(Continued from Page 1)

impossible. Without any written backup of reservations made, confirmations were also impossible.

When the blackout occurred, the computerized radar systems used to control air traffic at Newark, Kennedy and LaGuardia Airports switched automatically to stand-by gasoline turbine generators, and air traffic radar control was uninterrupted, according to an FAA spokesman.

Some ground facilities at the airport were knocked out, however, and both Kennedy and LaGuardia Airports were closed down temporarily by the Port Authority.

Elsewhere, even within the LaGuardia terminal buildings, all was in darkness, a traveler said.

During the great power blackout of 1965 when the entire east coast from Maine to Washington, D.C., was affected, there were few computer systems in operation that had a direct impact on the public.

Award 'Irregularities' The Issue**HEW Investigators Probe On-Line Systems' Contract**

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. — An internal investigation at the Department of Health, Education and Welfare (HEW) is probing how a computer services contract was awarded two years ago and if the winning bidder had an unfair advantage.

The investigation is centering on "possible favoritism, gratuities or other irregularities" in connection with the original contract award, and not particularly with the performance of work done under the pact, according to Robert Wilson, spokesman for the department's Inspector General.

Edwin B. Parker III has been relieved of his duties in connection with the Office of Education project covered by the contract. He has been "detailed to other duties at full salary pending completion of the investigation," Wilson added.

The project involves the automation of the Guaranteed Student Loan Management System under which HEW monitors the status of "millions of students, 8,000 post-secondary schools, 10,000 to 15,000 banks and loans amounting to some \$10 billion," according to Parker's replacement, Maurice Tansey.

HEW auditors and investigators are also looking into the close relationship between Parker and Gilmore S. Wheeler, a consultant hired by On-Line Systems, Inc. (OLS) of Pittsburgh, to whom the contract was awarded in 1975, according to a report in the *Detroit News*.

An article in the *Wall Street Journal* quotes an unidentified HEW official as saying the probe is focused more on HEW employees than on the contractor. The department is concerned there may have been violations of its code of conduct for employees, he said.

Punishment could range from a reprimand to firing, the *Journal* added.

The *Detroit News* quoted OLS president Jack Roseman as saying he was "shocked" that the probe was "even referred to as an investigation."

"As far as I know it's just a review of our program to make sure everything is documented. We welcome that kind of review," he added.

OLS issued a statement earlier this month, acknowledging that HEW is conducting an "audit and investigation" of the procurement of the original contract and "certain OLS expenses, primarily related to business meals of [Office of Education] employees incurred during its term."

The company also "understands" HEW is investigating "certain other" contractors for similar reasons, the statement continued.

Wilson clearly disagreed with those assessments. "This certainly is an investigation. It is not a common thing. It is unique," he countered. He would not say, however, how many people are on the investigative team, how it is organized or how long the probe will last.

'Matter of Some Priority'

The investigation began two or three months ago and the department now senses that it is "a matter of some priority to get it done," he said, lending credence to estimates that the probe will wind up within months and "possibly within weeks now," in the words of one observer.

The Inspector General's office at HEW was created by Congress late last year and is organized as three groups, focusing on auditing, investigations and health care system reviews. *Detroit News* reporter Seth Kantor said both auditing and investigative groups were active in the probe.

The ties between Parker and Wheeler are social as well as professional, according to Kantor, who noted that the consultant

served as best man at Parker's wedding in June.

That had no effect on the contract award two years ago, according to Wheeler, who told Kantor that Parker "insisted on withdrawing himself" from participating in the contract review at HEW which led to OLS getting the contract.

Wheeler admitted to Kantor, however, that one of the charges HEW is probing is that "information was supposed to have been advanced from inside HEW to On-Line before the bidding began." If true, that could have given OLS an advantage in making its presentation to HEW, Kantor noted.

The loan program started in 1969 and by 1975 there was a pressing need to get the automated management system up

and running on equipment outside HEW since in-house facilities were already over-worked, according to Tansey.

There was no time to develop custom software and the OLS proposal, involving the use of software capabilities the network already had in place, was the best of all that HEW received, he added.

Contract Terms

The contract, initially for one year but with two one-year extensions at the option of the government, covered adapting OLS software to the project needs and processing the work once the programs were ready. Both extensions have been exercised by HEW and the contract has amounted to a \$7.5 million piece of business for OLS.

Essentially all of the system is opera-

tional now, tied to the On-Line data center in Pittsburgh, Tansey said. Development work continues, however, as the original programming is optimized to particular tasks and modified to meet changes in the law.

In an interview, OLS chairman John Godfrey took exception to news reports which focused on how the contract has grown in value. He said he was bothered, for example, by stories which compared the first year price of \$1.6 million to the three-year figure of \$7.5 million.

He also noted that OLS was able to implement the system faster than expected — "thanks to our software" — and production work, "which is absolutely essential if the government is to control the loan program," got started earlier than initially expected.

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Is 5x7 Dot-Matrix CRT Terminal Tomorrow's Endangered Species?

By John P. Hebert
Of the CW Staff

Could a CRT terminal that displays characters in a dot matrix format be on the endangered species list in the near future because it's hard to read?

Definitely not.

But although terminals with the 5 x 7 dot-matrix type of character generation are most widely used because these units are cheaper, other types of terminals are currently available, and at least two manufacturers are experimenting with still other alternatives.

Some commercially available models generate characters composed of a greater density of dots or use line segments or strokes for character generation.

Other terminals use plasma gas, light emitting diodes (LED) and liquid crystal media. However, these are limited to displays ranging from a few characters to a line or two — and rarely more than three dozen characters — according to a report on alphanumeric display terminals published by Datapro Research Corp.

Datagraphix Corp. introduced a relatively inexpensive display that utilizes fully formed characters at the National Computer Conference, and IBM is experimenting with a laser beam technology.

Although the present dot-matrix display method is adequate for information reference, it can promote eye fatigue or strain for operators who use CRTs under the wrong lighting conditions and/or for extended time periods.

Fully formed characters are theoretically less fatiguing to read. But eye fatigue or its absence is also dependent on where the terminal is located and how much it is used at one time, optometrists agree.

If a CRT is used intermittently, the operator can get by with the standard 5 x 7 dot-matrix display. But full-time CRT operators using the same display might

experience eye discomfort, as might the programmer who spends two hours in front of it in a brightly lit room.

Datagraphix spokesmen declined to comment on the new product.

Experimental Terminal

At IBM's San Jose, Calif., research laboratory, scientists who have built an experimental terminal to demonstrate the laser beam display technology suggested the laser beam terminal as a replacement for certain applications such as engineering graphics or newspaper page formatting.

For most applications, however, they also agreed the CRT terminal presently in use is here to stay.

The major drawback of CRTs, an IBM scientist said, is the cost barrier to displaying more than one million picture elements on a single screen. The laser-written displays do not have that limitation, the spokesman said.

Further, the laser-generated characters are more sharply defined than in CRT displays and appear black on a white background, giving the look of a typewritten page, according to IBM.

The technology utilized in the IBM experimental device has the potential to display characters in a 20 x 40 spot format, the IBM spokesman pointed out.

"We think we can put more elements on the same size screen," in addition to making the screen itself larger than the conventional CRT found in computer terminals, according to the researcher.

There is a drawback, however. This method of scanning takes the laser 50 milliseconds to form a character — or about 20 char./sec.

Although the speed is sufficient for entering information from a keyboard, it is much too slow for displaying information that is already stored in a computer, IBM admitted.

CRT-Bound Workers Strain Eyes

(Continued from Page 1)
Sparks said.

The people most affected by the terminals, he explained, are those who use the device day after day without any breaks. "They are asking too much of their eyes," he said.

The muscles of the eye are like any others — "If you run for 10 miles, your leg muscles will hurt."

"Some people are not suited for this kind of work," according to Sparks, who sees the problem as symptomatic of our society as a whole.

"This computerized world of ours is creating problems for our eyes. The population is becoming more and more nearsighted because more people are working in closed rooms and confined spaces," he said.

Recommendation to Doctors

Sparks believes doctors should observe and experience first-hand the conditions related to patient complaints. His travels through computer rooms and CRT terminal clusters have led him to some conclusions concerning those who use and manufacture the devices.

Vendors could come up with a better glass to prevent glare, he said. Employers should eliminate glare in offices and try to achieve a point of equilibrium between the brightness of the room and the brightness of the CRT screen.

Related to this is the use of the proper lighting on the screen. A CRT terminal should always display illuminated (light) characters on a dark background.

The dot-matrix print displayed on the terminal screen or found on a computer printout is "horrible," Sparks said. This type of character — generated by a wide

variety of CRTs and computer printers — is very difficult on the eyes. The operator or printout reader must constantly try to bring the characters into focus, forcing the eyes to work harder, according to the doctor.

Breaks Suggested

For people who use the terminals, Sparks suggested they often look up from their work, take at least a couple of nonreading breaks during the day and blink their eyes.

Full blinking, he said, is very important because it ensures the eyes get necessary oxygen. Depriving the eyes of oxygen will cause them to swell, as it will any other body tissue, he added.

Apparently, there never has been a formal or informal U.S. study performed on the effects of CRT terminals on their operators.

Dr. Paul Lappin, dean of the New England College of Optometry in Boston, doesn't think working with a computer terminal is any more stressful for the eyes than reading a book.

"If you do it all day long, it will be fatiguing," Lappin said, but "there is nothing about the [CRT] per se" that contributes to eye stress any more than other close-work situations.

Old Question

The question of whether eyesight is adversely affected by such situations is an old one, Lappin said, recalling experiences with radar screen operators' complaints of fatigue.

"Eye fatigue in the radar operators was difficult to diagnose or even define," he explained.

Congressional DP Service Seen Enmeshed in Politics

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Politics inevitably becomes an element in the systems design of any DP effort which directly impacts members of Congress, according to Dr. Frank Ryan, former director of the House of Representatives Information Systems (HRIS).

Speaking at a conference of DP executives here recently, Ryan, who left HRIS to become director of athletics and a member of the mathematics faculty at Yale University, compared his old operation to a service bureau created to develop applications that would better serve Congress.

Service to Congress, however, is more an art than a science, Ryan said. He found the systems developed to meet particular problems of members of Congress during his tenure as HRIS director were valued by the Representatives for very different reasons.

The beginnings of HRIS itself are rooted in politics. When the idea of using computers in the House was first discussed in 1971, Wayne L. Hayes (D-Ohio) had just risen to become chairman of the Committee on House Administration and the number of telephone lines running into each member's office was the primary information issue, Ryan said.

HRIS was initially "a little vendetta" started under the Administration Committee as a result of a debate between Hayes and the Clerk of the House over who should be responsible for House DP, he stated.

Ryan, who played quarterback for the Cleveland Browns and then for the Washington Redskins, said he was thankful to have been in football before he got to the House. "There are anxious, hungry and tough people in the House as well as on the field," he explained.

When Ryan and his staff designed the House's electronic voting system, they thought that it would help Representatives vote faster. Used for the first time on Jan. 23, 1973 for a quorum call, the system, which runs on dual Control Data Corp. 1700 mainframes, saved approximately 500 hours of legislative time that would have been needed to answer roll calls without it.

'Strategy Devices'

But the Representatives liked the system for reasons other than its reduction of voting time from almost 45 minutes to 15 minutes. For example, the manual voting system had had a high instance of errors in recording votes.

It also permitted "ghost voting" by members not even in the Capitol when a vote on an issue was taken.

Today, members of Congress can look at almost any subset of Representatives whose votes they want to track using CDC terminals on the House floor and in their own offices. The CRTs have become "in-progress strategy devices," Ryan said. He added that the system has given the leadership in the House more control over its followers.

Members now vote about twice as much as they previously did, but gamesmanship has come into play in the casting of votes, the former HRIS director noted. The House has had an unprecedented

set of tie votes, for example.

When the CRTs were first installed on the House floor, Ryan said, members reportedly sat at the terminals, pressing the buttons to change their votes back and forth and watching the changes register on the display panels located around the chamber.

Another system designed to track the status of legislation has been very popular, attracting approximately 1,200 phone calls on particular bills each day with a 2:1 busy signal ratio at the Bill Status Office, Ryan said. The system re-

lieves congressional staff people from the tedious chore of following a bill through the legislative process.

Resistance to Comis

Still another system, the Committee Meeting Information System (Comis), intended to alleviate the high instance of schedule conflicts on a given legislative day, also has run into flack.

The problem is that the committees don't want other committees to know which of their rooms are available. The dynamic scheduling

system would have all committees report the meetings they plan to a central data base that would help staff workers assigned to arrange meetings avoid conflicts.

HRIS has tried to get the committees to use Comis for two years. In addition to not participating in the system, the committees have also created "ghost meetings." HRIS is now trying to bring committee meeting information together without room information, Ryan said.

Explaining HRIS' current effort to develop a communications

network with a terminal in every member's office, Ryan said when they have their own devices, they're "generally happy, regardless of what they do."

He cautioned DP professionals to be aware of the perception Congress has of computing.

Representatives will look at issues in the industry, like those involved in the Consumer Communications Reform Act — better known as the Bell Bill — with the same understanding of DP that they have in their own environment, he said.

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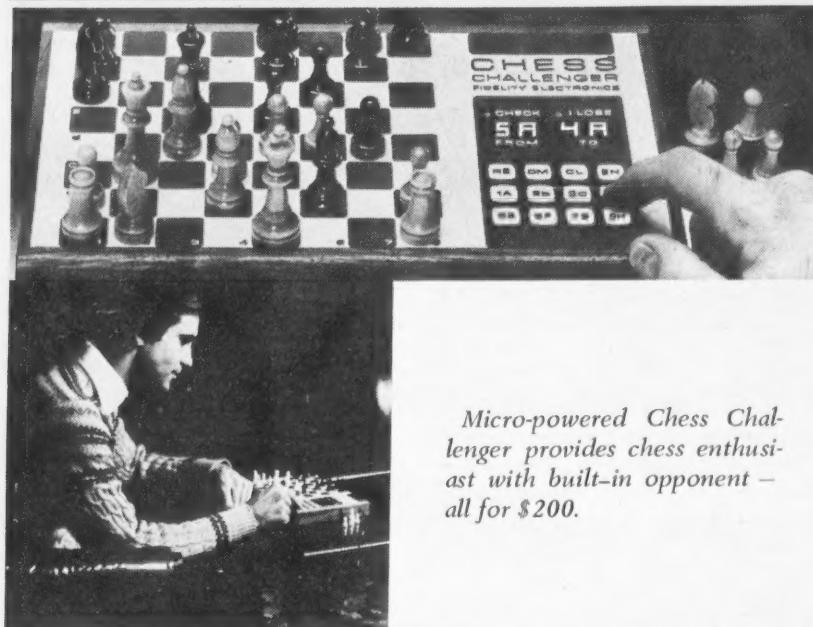
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Micro-powered Chess Challenger provides chess enthusiast with built-in opponent — all for \$200.

Micro-Controlled Challenger Plays 'Unnerving' Chess Game

By Molly Upton

Of the CW Staff

ROCKVILLE, Md. — Those who have the urge to play chess but who can't find a partner can eliminate their frustrations by playing with Chess Challenger, a microcomputer-controlled game.

The player indicates his moves by inputting the position to which he is moving a piece on a 12-key control pad. There is no need to identify which piece is being moved because the Challenger retains that information from previous moves, according to Harry Krause, marketing manager for Chafitz, Inc., an electronics specialty store here.

The game then responds with its own move, usually within one second, and the new and old positions of the Chess Challenger are displayed in four light-emitting

diode characters, Krause said.

The game was developed by a medical electronics engineer and incorporates an Intel Corp. 8080 microcomputer, which is programmed to play an aggressive game, Krause said.

The Challenger assigns a value to each piece and goes for board control. "If you're not very careful, you lose," Krause said.

Improves One's Game

One can also improve one's chess game through repeated encounters with the Challenger, he said. When Krause started, he lost 18 out of 20 games, but he is now splitting on a 50-50 basis, he added.

However, having one's opponent react so quickly can be "a bit unnerving," he warned.

"We've even had parents who play chess buy a Chess Challenger for their children who are just learning the different pieces and moves," a spokesman said. Once beginners learn the basic moves, they can practice games and strategy and become a decent player in a relatively short time.

Chafitz is the exclusive direct distributor, although the unit can be found in some department stores, Krause said.

Beginning in July, Chafitz expects to offer two other degrees of difficulty for the game by incorporating another micro, he said. First priority will be to retrofit current customers' games, he noted. The upgrade will cost about \$75, and the Challenger costs \$200.

The existing game has instructions enabling players to make the computer move first or set up special problems, Krause said.

Chafitz is at 1055 First St., Rockville, Md. 20850.

EFT Commission Gets Revealing Feedback From General Public

By Frank Vaughan

Of the CW Staff

HOUSTON — When commissions meet to ponder such weighty issues as electronic funds transfer systems (EFTS), even the best minds can overlook the questions which are of great concern to the public.

Wayne Boucher, who has been serving on the National Commission on EFTS, related one of the unusual aspects of the commission's efforts at the 5th Annual International Conference of the EDP Auditors Association here.

As a result of an erroneous wire service news story, the public was told the commission was seeking public comments on EFTS, and 6,000 letters arrived at the commission's offices. Only 11 were in favor of EFT, 10 were "uncertain" and the rest were against it.

Rather than ignoring the letters, the commission compared their contents with its concept of what constraints should be placed on EFT systems.

The commission had been examining such aspects as controls, use, impact on fiscal and economic policies, cost benefits, the management of information and privacy, recordkeeping and telecommunications.

Religious Implications

The concerns of the public matched the areas the commission was examining with one exception: religious implications. A good number of the letters received quoted the Bible's Book of Revelation and voiced a concern that the move to electronic funds was one step further in man's race to the "last days."

People feared they would soon have their Social Security numbers printed on their foreheads by laser beam without their knowledge," he explained.

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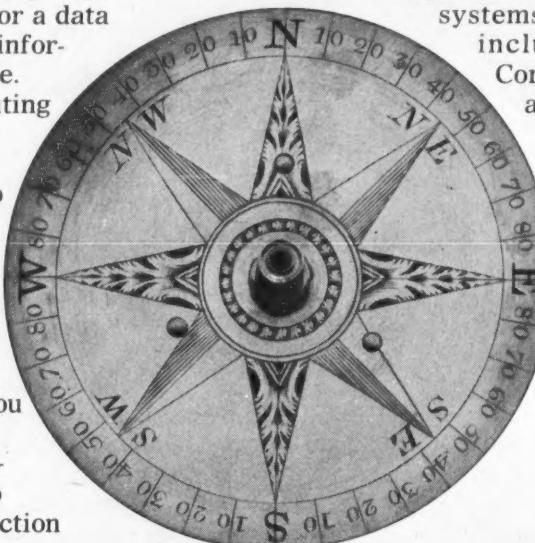
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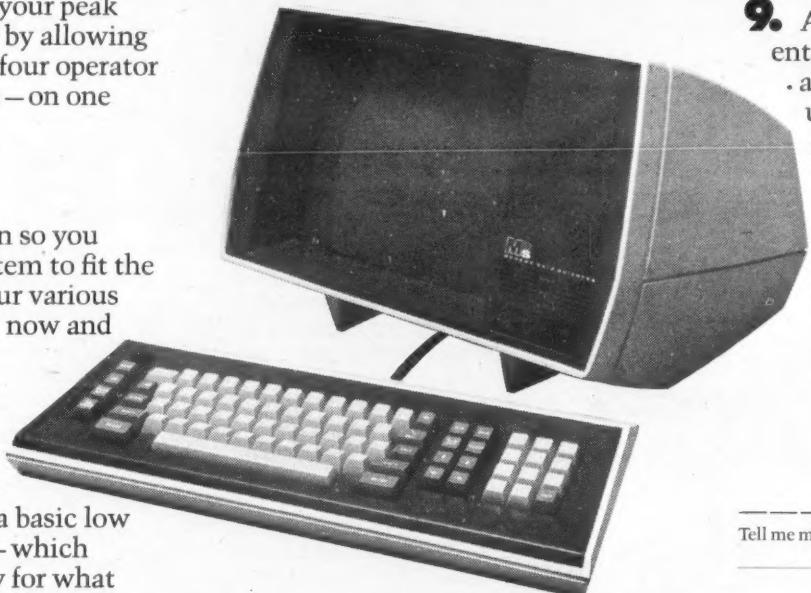
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Technicians Prepared for Tomorrow

DP Operator Training Seen Aimed at Today's Tasks

By Ann Dooley
Of the CW Staff

DALLAS — The training provided for computer operators in a production-oriented DP center has different goals from that aimed at a more technical and highly educated staff, two DP training experts at a recent conference here agreed.

Because of time and money priorities, operators are trained to function at their assigned tasks, while a more technical staff is often trained for career growth and knowledge enhancement, they said.

Jack Stone, owner of Computer Education International, Inc., described to attendees his method for improving performance and employee activity in medium- and large-scale computer centers.

Training is an art form, Stone said, but trainers must get more responsibility in or-

der to be more effective at their jobs.

Sometimes various kinds of employees are included in the training sessions — secretaries as well as DP personnel — and everyone wants help with their particular problems. And when the training period lasts only a few days, it's impossible to solve all the problems, he said.

One way of alleviating the difficulties is to find out what the key problems are before the training begins, Stone noted.

A training proposal should be circulated to the client so employees will start talking and thinking about the program. The proposal should be sent all the way down the line so the operators, who will be most directly affected, will have a chance to contribute their ideas, he said.

Such an effort is worthwhile since the students appreciate being included in design-

ing their own development program, Stone added.

For the most part, the attitude of the operators and other DP personnel is very negative. "There's a lot of hostility," he said, because they feel undervalued and ignored.

Problem of Resentment

When a problem with the computer occurs, the operators don't know what to do, so the system analyst comes in and takes over and the operator resents it.

While there is a growing awareness of the need for training, it is often done in a "slapdash way." The usual excuse is that a company's employees are too busy to take time out for training.

But what kind of product are they developing? Stone asked.

Cost-effective training should teach only the skills that the operator uses today's DP environment, according to Stone. "That's all you can expect — better skills today," he said.

Providing training time away from the current job is crucial to learning, he said. People must have time to think and reflect on what they've heard or they won't remember it, he stated.

The program should offer only a limited objective as to how much the trainees should learn, he said. They don't need to know more than the elementary concepts of the system. But right now, they don't know anything about what's going on and "yet we entrust them with a thousand-dollar environment," he added.

A basic problem with which operators must deal is that they have no identity — they have no desks of their own or individual working areas. They want to become programmers because they feel they will be identified then, Stone said. The problem is that many of them don't have the communication skills or business backgrounds to be programmers, he said.

Honeywell Program

In contrast to Stone's training program, Lawrence Lunetta, manager of the Advanced Engineering Program at Honeywell Information Systems described how Honeywell's program attracts and places "knowledge workers." It must be determined who the knowledge worker is, what he's doing and where he works best, and that can't be found out in a typical training program, he said.

The Advanced Engineering Program helps the knowledge worker determine alternatives by rotating his work assignments, Lunetta explained. Each student is provided with a wide variety of experience in hardware and software over the three-year program, he said.

Each program member receives a graduate or doctoral degree from Arizona State University, time off from work and most expenses paid, Lunetta said.

In addition, internal training is offered including lectures, seminars and hands-on training, most of which is customized to Honeywell equipment, he said.

Students Recruited

Although program members were originally recruited from within the company, today most students are recruited from universities. It was discovered that employees with well-established lifestyles found it difficult to devote the 60 to 80 hours a week the program sometimes demanded, according to Lunetta.

Recruiters look primarily for someone with a B.S. in electrical engineering or computer science who is in the top 5% of his class, he said. Applicants must be highly motivated and regard the program as a reward because they consider themselves "more special than others," Lunetta said.

Currently, there are 26 students in the program, with a yearly turnover rate of 10 to 15 people in the form of incoming and graduating students, he added.

The program offers education plus experience, special opportunities, a company commitment to develop each member's skills, varied work assignments, internal training and "being exposed to the leading edge of technology," Lunetta said.

The company benefits by bringing in top talent from around the country, he added, and the retention rate has been over 80%.

The program creates a balanced system providing the student with career flexibility while the company gets critical work accomplished. The student has special opportunities and the company is provided with future leaders.

While Stone admired such a program, he said it was unrealistic to attempt in a production-oriented environment.

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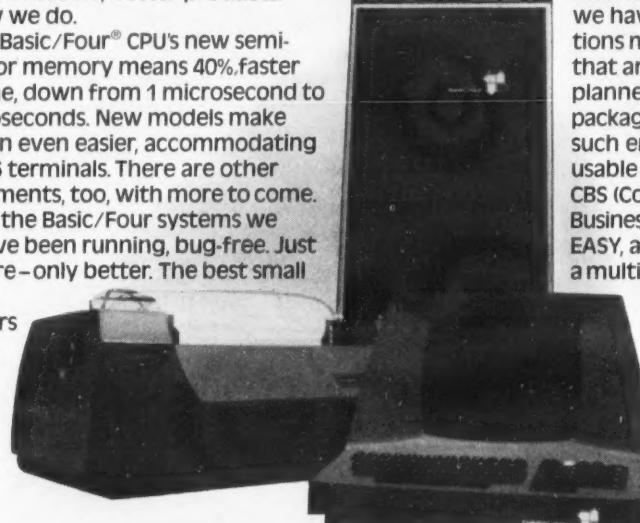
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Pushbutton System Gives Teacher Students' Feedback

By Ann Dooley
Of the CW Staff

CLEVELAND — Students at Case Western Reserve University here can tell at least one of their professors what they think of his teaching under an experimental program designed to improve communication.

The Olin Experimental Classroom study utilizes student-activated electronic push-button boxes, TV cameras and a Texas Instruments TI 960 process control computer, according to associate professor James L. Rodgers.

While student response systems have been used in this country and the Soviet Union for some time, these previous systems would allow the students to respond only at the teacher's initiative and only on a multiple-choice format, Rodgers said.

Using the experimental classroom and a 12-button key set, each student can respond within the format provided by the teacher. Although the student is limited to 12 responses in declaring his actual feelings, he can indicate such feelings as confusion over a lecture point, the wish to speed things up, the fact that he's bored with the material, or anything else that has been programmed, according to Rodgers.

The system isn't limited to any one set of responses, either, he said, since an instructor can change the labeling on the response buttons at any time. The computer, which displays and prints the responses, can also handle data in different forms.

Students Take Initiative

"The most distinctive feature of the Olin classroom is that students can respond at any time on their own initiative. A student who does not understand a point can indicate his confusion as soon as he realizes he is missing something," Rodgers pointed out.

The instructor has the ability to either monitor student response on the TI desk-top terminal during class or review the class on videotape with the tabulated responses superimposed on the image, he said.

Prof. Krishna Kumar used the Olin classroom for his statistical methods class during part of the

spring semester in order to encourage more participation.

"A student may hesitate to slow down the instructor in a traditional classroom because he fears his peers or the instructor may think he is 'dumb.' If the students feel the response is anonymous, they will ask for clarification when they need it," Kumar said.

While the class is in session, the instructor is unaware of who is pushing a button, but the videotape indicates which button on which desk was pushed.

Kumar is currently tabulating

results that will indicate whether the system has increased participation by his students.

He compared last year's responses with this year's by counting how many times each student pushed a button and the number of times each of the 12 buttons was pushed. The most commonly used button was "repeat," he said.

Most students liked the experimental classroom because they felt it made the professor more responsive to their needs.

The teacher response has been mixed. Those who might need it

most could also be the ones least willing to try it, Rodgers noted.

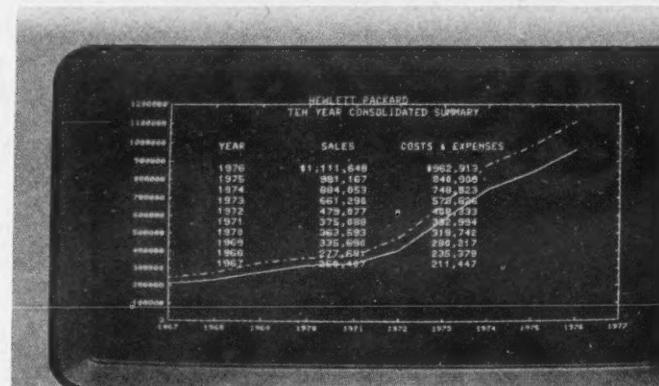
Another problem is that an interested professor must get his own funding for the classroom since the university does not provide any money toward the operation of the experiment, Rodgers said. So far, only Kumar's class has used the classroom.

Since the project doesn't have any operating money, student programmers were originally used, but the results proved to be very inconsistent, Rodgers said. The project was able to hire a

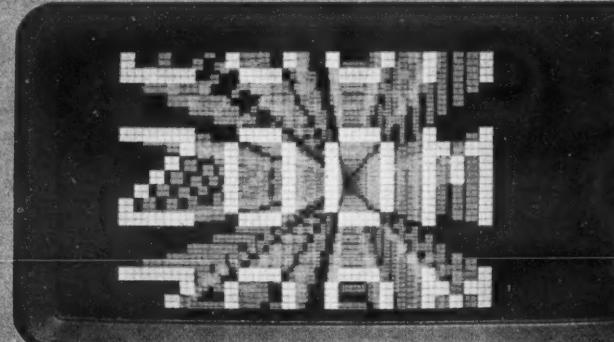
part-time programmer and everything has gone more smoothly since then, he said.

The Cleveland Board of Education recently used the classroom as part of a federally funded project to improve the quality of classroom observation and evaluation. Administrators watched videotapes of several classes and used the response buttons to evaluate the teachers. With a printout of the evaluations, their supervisor was then able to discover areas of agreement or inconsistencies within the group.

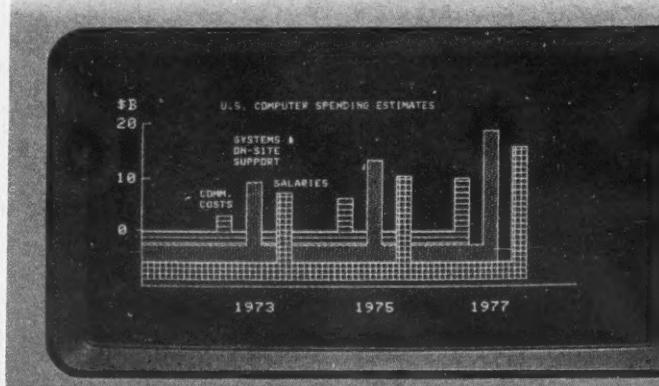
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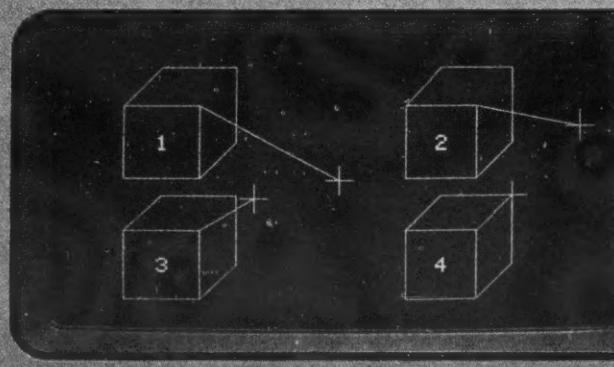
Auto-Plot



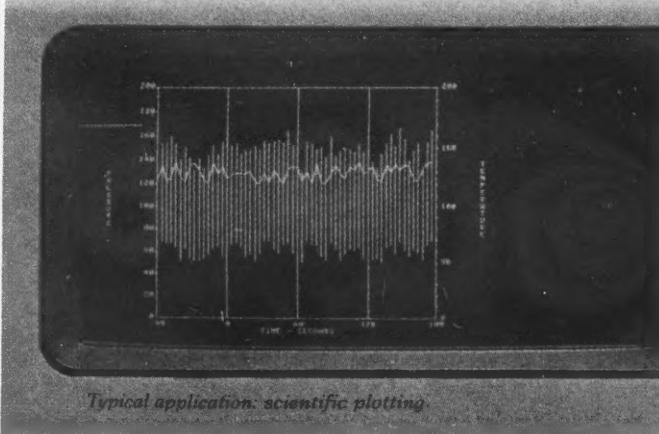
Zoom



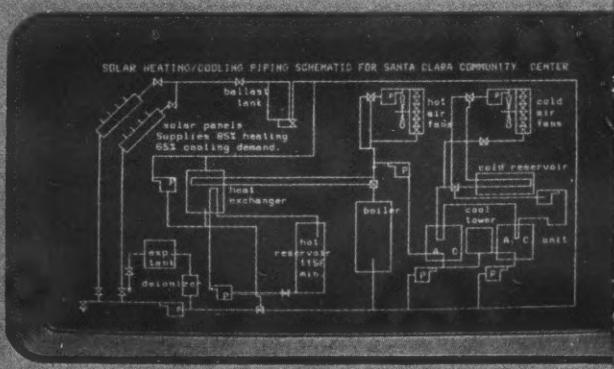
Area shading



Rubber-band line



Typical application: scientific plotting.



Typical application: process flow diagram

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ICCP Honors Top CDP Exam Scorers

CHICAGO — Two DPers who received top scores on the 1977 Certificate in Data Processing (CDP) examination will receive cash awards and CDP keys and certificates.

Paul Rosenthal of Gottfreid Consultants, Los Angeles and Samuel T. Redwine of Applied Management Sciences, Inc. of Silver Spring, Md., will receive \$250 each from the Institute for Certification of Computer Professionals.

Four individuals shared the top score in programming. They are: Robert L. Schwenk, employed by Pacific Mutual Insurance Co. of Newport Beach, Calif., William LaPlant Jr., who works for the United States Air Force in Washington, D.C.; Manley Reynolds of Mount-

tain Bell in Denver, Colo.; and Moshe Rabinowitz, who works with Metropolitan Life Insurance Co. in New York.

Fred L. Potter, who is employed by Solloway, Hollis, Godfrey and Soden in Concord, N.H., received top honors in the management portion of the examination, the ICCP said.

Top scorer Rosenthal received the highest grade in quantitative methods and Howard Glen Weekley, who is employed by the Texas Air Control Board in Austin was the nation's top scorer in systems analysis.

All receive CDP keys and certificates reflecting the award of Excellence and will be honored in their local organizations by ICCP representatives.

ACM Plans Job Register For Computer Specialists

DETROIT — An employment register for matching computer scientists and DP specialists with employment opportunities will be conducted again at the Association for Computing Machinery's Sixth Annual Computer Science Conference here Feb. 21-23.

Previous registers have attracted thousands of applicants who are both experienced professionals and new graduates as well as employers in business, industry, gov-

ernment and academic institutions, according to Orrin E. Taulbee, director of the register.

Anonymous applications are accepted, he added.

How It Works

The register works as follows: Each applicant completes a form giving identifying information, education, publications, experience, interests, references, position and salary desired.

The employer completes a similar form giving identifying information, position available, starting date, salary and benefits as well as education, experience and specialization required for the position advertised.

Three different forms are required, so when requesting forms, people are urged to identify themselves as applicants or employers in academic institutions, business, industry or government, Taulbee indicated.

A separate form is required for each type of position available, but only one form is needed in the case of several identical positions.

Must Be Typed

Completed forms must be typewritten since they will be reproduced exactly as submitted, and no photocopies will be accepted, he said.

Filing fees are as follows: applicants \$5 plus \$5 extra for an anonymous listing (students are free); and \$20 for employers for each job form submitted.

A check for the appropriate amount, payable to the Computer Science Employment Register, must accompany the forms.

Requests for forms should be addressed to Taulbee at the Department of Computer Science, University of Pittsburgh, Pittsburgh, Pa. 15260.

NCC Board Elects Chairman

SUNNYVALE, Calif. — Ralph R. Wheeler of Palo Alto, manager of computer time-sharing services at Lockheed Missiles and Space Co. here, has been elected board chairman of the National Computer Conference.

This policy-making body is responsible for arranging and conducting the annual meeting sponsored by the American Federation of Information Processing Societies.

Wheeler will serve a one-year term beginning July 1. He moves into the chairmanship after serving on the NCC's board of directors as the representative from the Society for Computer Simulation.

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Editorials

Record Keeping Under Scrutiny

The reprieve is over. With the final report of the Privacy Protection Study Commission last week (see story on Page 1), the record keeping practices of the private sector are now going to be coming under ever greater scrutiny.

The report does not call for blanket federal regulation of private-sector record keeping, but rather points to 14 areas where there is a need for new legislation to help safeguard personal privacy.

However, all people involved in private-sector record keeping — particularly users of computerized systems — should be aware of the report's recommendations and its proposals for legislative action.

The new regulations could affect almost every DP shop in existence in one way or the other over the next few years.

All DP managers should become informed about the potential effects on their operations and should be willing to inform their congressmen about parts of the legislation they feel will either be too restrictive or not restrictive enough.

Only with constructive participation from those familiar with DP will Congress be able to sort out the myriad issues raised by the commission's work. The commission did an excellent job, but its recommendations will now be reviewed by Congress and possibly changed.

Your participation in the process is needed.

It's Time for Ifip

The 1977 Congress of the International Federation for Information Processing (Ifip) in Toronto next month (Aug. 8-12) promises a wide-ranging technical program that should be of interest to many people in the computer community.

But conferences such as Ifip can only really be successful if they draw a large number of well-informed participants — not only on the dais but also in the audience.

So this is a reminder that there is still time to sign up for the conference program, even though it does carry a rather stiff \$145 price tag. Out of the 108 sessions and 30 "mini" symposia there is something for everyone.

What is needed is participation by users, vendors and the assorted other folk that make up the U.S. computer scene.

You can get complete information from the Organizing Committee for Ifip Congress 77, c/o Canadian Information Processing Society, Suite 214, 212 King St. W. Toronto, Ont., Canada M5H 1K5.

These triennial congresses only rarely visit North America (the last was in 1965) so this may be your last chance for years to take part in this most international of all computer conferences.



'Stop, Thief, I Say! . . .'

Letters to the Editor

Reports of Successful NCC

Elicit Response: 'For Whom?'

As I read your editorial extolling how smooth and well-run the recent National Computer Conference in Dallas was, it reminded me that it was the most frustrating experience I have ever had in attending a computer convention during my 20-odd years in the field.

You must have received different treatment from that given the average attendee. I heard many complaints, especially about the parking and lack of space at the various technical sessions.

Personally, because of a lack of space, I was able to get into only one of the six sessions on microcomputers I wanted to attend. The Afips (American Federation of Information Processing Societies) people I talked to were not even sympathetic about the situation. Their best answer was: "Yes, isn't the convention a big success?"

My question is: "For whom?"

In addition, the Dallas Convention Center was designed without any consideration for getting a wheelchair from one level to another. Furthermore, none of the guards or information center people could help us or showed any concern.

It was only through the help of some of the center's maintenance personnel and one of the college women passing out literature that we found the freight elevators that allowed us to go from one level to another.

Thanks for your good coverage of the convention, as I have been able to read about several of the sessions I was unable to attend because of the space problem.

W. Thad Lee

League City, Texas

System/80 Features Here Now

I don't claim to be an expert on the subject, but if I'm not mistaken, many if not most of the "advanced" features Lecht foresees for the IBM System/80 ("The Waves of Change," CW, July 4) have been in use for some time on such Burroughs systems as the B1700 and B6700.

This makes it all the more frustrating that Burroughs hardware reliability and maintenance are so notoriously inadequate.

Donald S. Schmick

Atlanta, Ga.

ACM Ombudsman Explains Goals

In his column [CW, July 4], Alan Taylor attempts to tell the world what the ACM (Association for Computing Machinery) Ombudsman Program "apparently intends to do." What amazes me is that at no time did he ask me.

The ACM Ombudsman Program exists to resolve difficulties that may arise when people interface with computers. Specifically, our goals are to:

- 1) Educate the public concerning the computer's real capabilities.
- 2) Identify and help resolve any generic cause of computer-related problems.
- 3) Act as a third-party fact-finder.
- 4) Strive to improve interfaces between individuals and computers.
- 5) Respond to instances of "blaming the computer."

The program is much more extensive than Taylor imagines. In fact, it has been very successful in:

- 1) Analyzing computerized election systems in Detroit and Los Angeles.
- 2) Reporting on EDP schools in Nebraska, New Jersey and southern California.
- 3) Publishing a report entitled "Privacy, Security and the Information Processing Industry."
- 4) Studying the Bay Area Rapid Transit System in San Francisco.

In short, the advancing knowledge of computers is becoming understood both inside and outside the ACM.

Dahl Gerberick

Chairman, Ombudsman Committee
Association for Computing Machinery
New York, N.Y.

Data Past

Five Years Ago

July 19, 1972

PHOENIX — A federal judge ruled here that there was not enough evidence to send the 33-month-old Greyhound Computer Corp. vs. IBM case to the jury.

Two days after IBM was granted the directed verdict, Greyhound filed a notice that it would appeal the case.

Eight Years Ago

July 23, 1969

NEW YORK — A service that converted 1401 Autocoder or 7074 Cobol into 360/DOS Assembly language or OS Cobol was introduced. Peter D. Colgan, president of CPU Management Advisory Corp., said "the Total-Tran package can convert, or at least flag on the listing, 100% of the statements in any Autocoder program." Maximum cost was 60 cents per statement.

LOS ANGELES — An investigation into the possibility that fraud could be committed with computerized voting was ordered by the Los Angeles County Board of Supervisors. Critics charged it was possible to rig elections with the system being used, an IBM Votomatic.

'People's Computer Center'

DP Education Program Reaches Inner-City Residents

By Jack Stone

Special to Computerworld

It is commonplace these days to read of the marvelous achievements of computer technology in industry, science, commerce and government. And it is normal for one to relate these successes to one's own professional and personal situation. As the members of the DP industry are reasonably well-off economically, socially and culturally, advances in computing are directly coupled with our personal growth and development aspirations.

But there is another segment of our society which has an entirely different viewpoint toward computers. I refer to the citizens of the inner-city segments of American urban communities.

Because of a long history of economic and social deprivation, most of these people view the computing industry as a source of fame, fortune and riches for higher ranking social classes and perceive advances in the technology only as serving to widen the gap between rich and poor. For those few who have made a successful transition from poverty to a decently paying DP job, success came only after intensive competition with better educated people.

In summary, it is difficult to identify those areas where computer technology has been of particular benefit to the poor, except possibly for the prompt and accurate distribution of welfare checks.

Recently, I learned of a movement toward the establishment of a "people's computer center" located in the heart of the inner city, whose goal is to apply computer technology to the solution of some of the social problems in these communities.

In the District of Columbia, Afro-American Datanamics, Inc. provides such a capability. Milton White, board chairman, and Teixeira Nash, executive director, consented to an interview with me.

Q: Can you summarize the major aims of Datanamics?

White: Our motto succinctly characterizes the nature of our work: "technology for community effectiveness." Specifically, we are a nonprofit organization whose purpose is to provide computer technology for the use and benefit of the black community. However, while using the computer in community development, we are also striving to prevent the social abuses and dehumanization that tend to accompany modern technology.

Q: What is the nature of your organization?

Nash: We are a group of social scientists, social artists and social technologists. We view ourselves as a mixture of community people working within the unique and unifying socio-cultural framework provided by Datanamics. We hope that by bringing these three diverse disciplines together at the same computer consoles we will develop greater strength in solving the problems of the black society in America today.

White: You see, the arts of our community have for too long been at odds with the science of our community, even though these were often two approaches to the same goal — making it. The black community gambler and hustler are not far in a technological sense from the mathematician and the Wall Street broker. Datanamics must identify the strengths of these native technologists and apply these strengths for their utilization to community development as well as individual growth.

Q: Dr. White, what is your background and how did you get involved with Datanamics?

White: I am a part of black American society. I strengthened my knowledge of this society when I received my doctorate in political science from the University of California. I have had considerable academic experience at the university level, in both teaching and administrative posi-

tions, and am currently an associate professor of political science at Howard University. I helped organize Datanamics three years ago when it became clear to me that the university establishment was not doing enough for deprived people in urban areas.

Q: What are the major services that you render?

Nash: Our primary service is that of computer-based education and training.

The Human Connection

Toward this end, we have installed a Digital Equipment Corp. PDP-11/45 with 96K words of main storage, which is configured with 10 DEC terminals, six teleprinters and four video. The machine system was provided as the result of a grant from DEC, to whom we are deeply grateful.

Through the use of these teaching terminals, we offer courses to advance the basic skills of math and reading, plus courses in DP. The DP courses include machine operations, programming and data entry, and the terminal training sessions are, of course, supplemented by "hands-on" experience. We have programming courses in Cobol, Fortran and Basic.

With our computer capability, we are able to help support and rehabilitate organizations in our community, such as neighborhood employment services, religious groups and economic development projects.

Q: Can you describe your educational software, as it were?

White: We have two general types of terminal-oriented educational programs. We call the first one "computerized learning," in which all instructional material is

presented at the terminal. The student works at the terminal on an individualized basis, moving at his own pace.

The second is called "computer-assisted" or "computer-managed" instruction, in which the terminal serves only as a tutor — a "homework coach," if you will. The material in this case is of the drill and practice variety and requires that an experienced instructor be present.

Q: Where do you obtain your educational software?

Nash: Well, we tried very hard to use commercially available packages. However, they don't work well in our environment because our students have difficulty understanding their questions. So we develop our own, using teams of instructors and neighborhood citizens which we call "cultural language committees." We use high school dropouts in the course authoring process to help compensate for the language gap of our staff caused by social and age factors.

I should note that we have had about 200 citizens pass through our terminal training and have more than 1,000 waiting in line. All training is provided at no cost to the student.

Q: And what does the future hold for you?

White: I visualize growth in three areas, depending on availability of external funding: extension of instruction into the home to accommodate the inner-city stay-ins, via combined TV and computer technology; computerized community support of health clinics, cultural events and tips on nutrition and energy; and the expansion of our concept into other major cities to create a network of community computer centers to serve more of the economically and socially deprived people of this country.

Additional information may be obtained by writing to Datanamics at 3201 14th St. NW, Washington, D.C. 20010.

Advent of 'Vax'

Large Minis Could Signal End to Huge Price Markups

The relationship between the manufacturing costs of computers and their selling prices has traditionally been one of very high markups, at least with the traditional "carriage trade" firms. A markup of 500% over cost has not been considered unusual, and 600% or more is not unique, by any means.

Moreover, these prices have been charged for equipment that recovered all its research costs years ago, so the standard excuse that manufacturing costs are only a small part of actual costs really did not hold water. Technology appeared to insulate prices and keep them high.

But now, a new, officially unannounced computer from the minicomputer market seems destined to break the immunity from market economics that has kept maxicomputer prices at such high levels. Called Vax, and scheduled for announcement in October by Digital Equipment Corp., this 32-bit system is priced according to the economics of the mini industry — which has never been able to establish the complete financial control over its products to which maxi marketeers have been accustomed.

Even the initial price for this computer and its successors has to be established recognizing the strength of competition from the mini market and its ability to produce effective hardware at lower prices. So the markups will not be extremely high to start

with, and they will come down as time goes on.

Really, what is happening is the beginning of the merger between minis and maxicomputers — with considerable benefits for the current customers of both types of systems.

Through emulation and through language facilities, the minicomputer user will get both the additional power that is often needed and the ability to use his current programs, to match in with traditional 16-bit minis.

The maxicomputer user will get the ability to use a system much like the ones he has grown up with, but at reduced, competitive hardware costs not offered by the traditional maxicomputer market.

Powerful peripheral and communication flexibility in particular will be economically available. In addition, this flexibility can be expected to be enhanced by the ingenuity of the many smaller specialized manufacturers who have already gained considerable understanding of DEC's bus architecture and how to use it to its best advantage.

Maxi Future

What this development will do to the maxi market is anyone's guess. The key point appears to be that the end to users' automatic growth demands seems to be here, and with it the end to automatic renting of larger and larger systems.

Most high-volume applications are already up and running. Despite great progress in theoretical understanding of optimization and transportation algorithms, invoicing and payroll-type applications as opposed to weather-forecasting are what the maxi user sees his computers handling in the next few years.

The maxi user's confidence in his own DP staff's abilities has also grown. The necessity for constant reeducation has dropped off from its Sixties peak, when it seemed that no sooner was an application working than something had made it obsolete.

At that time the carriage-trade maxi

'Really, what is happening is the beginning of the merger between minis and maxicomputers — with considerable benefits for the current customers of both types of systems.'

manufacturers were really providing their users with something essential in return for the high markups they charged — but that time has long gone.

Yet, inertia among computer users is high. The maxi manufacturers will certainly be around for a long time to come, although one or two may succumb. There will still be various announcements and plenty of marketing department fireworks.

Software suppliers, who are doing a booming trade and producing some excellent products these days, will still concentrate upon supplying the needs of the maxi market first, as a proving ground for their products.

Progress will be slow on the surface. After all, it is nearly a decade since DEC announced the Decsystem 10 as an entry into the maxi market by a mini manufacturer. But that was always a maxi machine, sold a little bit differently from other manufacturers' large systems.

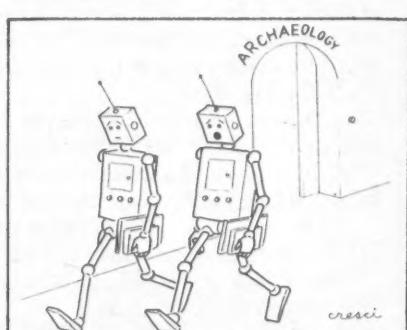
It was not, and could not be, what the Vax

family is going to be. Vax will gradually put to rest the concept that minicomputers are one area where the user can get hardware value, while maxicomputers are another area where the user can't get hardware value, but does get other compensations. In just another decade that concept will be gone.

Vax comes from, and will live in the era when additional logic is cheap and when language packages, operating systems, flexible input/output and applications are much more readily available than was ever anticipated.

Vax will have its successors and competitors which, among them, will provide service as good as that any maxi manufacturer can offer to the average user.

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Reader 'Horrified' by Stone

Is Supplying DP Training to Iranian Police Ethical?

Dear Mr. Stone:

I read with absolute horror your column of June 20. With all the recent talk of ethics in the computer field, to write an article about training Iranian policemen in computer technology without any consideration of how this technology might be used seems incredible to me.

Are you not aware of the horrors perpetrated by the Iranian police? The tales of torture, suppression of dissent and other acts of official terrorism are almost endless and well documented. Do you not have any qualms about facilitating this brutality?

It seems to me that if our profession is ever to confront the problem of ethics, it should start with the most blatant of abuses — and it appears that this training program could very well constitute such an abuse.

Since I do not know precisely what this

training was for and how exactly it will be used, I cannot say for certain that this was a breach of what I would consider professional ethics. However, the possibility exists and I would not have participated in such a

conscience.

Let me say that I enjoy your articles and appreciate your usual sensitivity to human issues in computing. This article, however, was such a departure from your norm that I felt compelled to call your attention to it.

I would be pleased if you could devote further articles to the ethics of supplying technology to persons who might misuse it. It is certainly an important but often ignored subject.

Saul I. Tannenbaum

Reader Commentary

program until and unless I was fully satisfied the end result would be benign.

Perhaps the thought that Iranian policemen are attaching electrodes to the genitals of an uncooperative peasant who was located by use of a computer system your students helped design does not bother you. Personally, I could not live with that on my

Dear Mr. Tannenbaum:

The seriousness of your accusations and the ethical issues you raised have led me to ask *Computerworld* to put both your letter and my response in print.

The project you question was originated in March 1975 by the Iranian Police De-

partment as part of a long-range training program to upgrade its computer center personnel, broadening their skills from those relating to a second-generation batch processing operation to those relevant to a fourth-generation distributed processing environment.

The Iranian Police Department had hopes of using U.S. systems development firms to construct and implement national police systems. In anticipating of this, it wanted selected members of its staff to gain a working knowledge of American computing and police management systems.

I believe the Iranian government approached Language House of Chicago and the Public Management Systems (PMS) division of Planning Research Corp. (PRC) of McLean, Va., to handle the English language upgrade and technology segments of the programs, respectively.

I have been an entrepreneur for 10 years and owner/managing director of my own education consultancy firm for nearly five years. I believe I conduct my business at the highest level of ethical standards present in the computing industry.

Further, though the industry has been very good to me, I feel I have given much to it through the courses I have taught, lectures at public forums, papers at professional societies and my column in *Computerworld*.

With that in mind, it should be easy to see why I took this assignment. First, I was asked to do it by PMS, which sought me after receiving a recommendation from a sister division for whom my colleagues and I had worked over an 18-month period. PMS/PRC is a big company, listed on the New York Stock Exchange; it could have gone anywhere in the world to obtain a training subcontractor, but it came to me.

I had a very strong business obligation because PRC is a major customer of mine and it needed my help in solving a very, very difficult training problem.

Second, all of the training performed by my organization is aimed at building the skills, attitude and motivation of DP managers and technical personnel to do a better job. We do not design or construct systems for customers.

As a citizen of the U.S. I strongly deplore the suppression of human rights anywhere in the world, including our own country, and I completely endorse President Carter's policy in this regard. But how do I deal with the allegations or even documentation of such violations of basic human rights in other countries?

Do I become a committee of one and reject my students and turn aside my customer and, in another dimension, discard the policy of friendship with the Iranian government, which is the established policy of the U.S.?

No, I don't believe my actions were a violation of professional ethics. Instead, I would have felt I had violated the trust my customer placed in me and would have ignored the established foreign policy of our country were I to have rejected the project.

Jack Stone

Tannenbaum is a programmer in Boston, Mass. Stone is president of Computer Education International in Washington, D.C., and a regular contributor to *CW*.



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SOFTWARE & SERVICES

Reading Mail Pays Off

Package Leads to Simpler Coding of CICS Programs

By Don Leavitt
Of the CW Staff

SAN FRANCISCO — Every once in a while, the flow of sales literature that passes over a DP manager's desk leads to something really worthwhile. That at least is the experience of a manager for an air freight forwarding firm based here.

Novo Air Freight has both domestic and international operations. The data center here, based on a 256K IBM 370/135 and a 512K 370/145 under DOS/VS, handles all accounting and shipment information for the corporation, according to Al Patrizio, director of management information systems.

The 145 supports all the teleprocessing for the firm including 40 local terminals and 110 more "spread from Alaska to Florida to New York to California," Patrizio said. The network is used for inquiry and data entry applications for a CICS/VS-driven data base residing on multiple spindles of

3340 and other disk space.

The programming staff, split into teleprocessing and batch groups, amounts to seven people with another slated to come aboard shortly. It is, in Patrizio's view, a limited but extremely talented staff.

Not long ago, Patrizio received a brochure describing a package from Oxford Software Corp. The full name of the package is User Files Online, but Oxford stressed the shorter name UFO in its brochure, and Patrizio admitted he was intrigued by the name and the artwork.

Beyond that, he "had to read it because of the application we were addressing at the time," an international shipment system. Classified as a display management system for CICS, UFO seemed to offer a way to avoid excess programming, he added.

Patrizio sent for more information but never built a formalized rating scheme to see how well UFO compared with other packages. He looked at one IBM offering,

but that was "a batch-oriented thing," no comparison to UFO's on-line support. The initial UFO packaging was "rather limited," he said. However, Oxford added procedural language support and that "tremendously enhanced" the system so Novo acquired it.

The vendor offered two ways of installing the package: remotely, in which the user does all the work, or with support including a stand-up trainer. "We chose the latter path. I wanted to make sure we understood how it worked. If there were any problems, we'd settle them right away," he explained.

Pleased With Training

Patrizio was pleased with Oxford's approach in the training class. "We tried to get help with our priority application, but Oxford told us to do it our way: training wasn't supposed to be programming class."

The manager had all of his staff sit in on the training sessions and that had an unexpected benefit. Having been introduced to the teleprocessing environment and an easy way to work with it, Novo's batch-oriented staffers "suddenly realized they didn't need 10 years experience to do well in it."

The batch programmers were familiar with CRTs and they continue to write batch programs, "but they have the feeling they can cope with TP if the need or the opportunity arises." They'd been using source statement maintenance from IBM on the terminals, but now they were picking up the attributes of the 3270.

Even though the teleprocessing application program end-product looks very complicated, they could see it was really quite simple, Patrizio continued.

Anything as simple to use as UFO "has to have overhead," he admitted. The software is a dictionary-driven system and in a test comparing the speed of copying data from Isam files and from UFO files, UFO "came in about two seconds slower" but for Novo's purposes that "isn't all that big a deal."

In any case, UFO code is supporting customer inquiries at two customer locations where it is satisfying an immediate need and doing it well, according to Patrizio.

The manager seemed to like the speed with which UFO can be used as much as any of the special capabilities it offers. He said his staff uses the package to develop ideas during application design time.

The center is a service unit for three or four subsidiaries of the Novo Corp. When these "customers" say they want something but then change their minds "it's not a disaster" to rearrange data elements with UFO, Patrizio said.

'Jobdoc' Tracks TSO Jobs, Run Books

HOUSTON — The Job Documentation System (Jobdoc) from Gulf Computer Sciences, Inc. is described as a series of programs operating under IBM's OS/360 or OS/VS for the centralization and control of computer jobs and documentation.

The system, which gains its on-line capabilities through an interface to IBM's Time-Sharing Option (TSO), keeps operators posted on what a job or program can do, what input is needed for it, how the work is run and what information can be obtained from it, according to a Gulf spokesman.

The software provides standardization and centralization, with all information available to authorized personnel at any specified location and with on-line instructions for obtaining it. A synopsis of all assembled data for each job contained in the system is also available, he added.

On-line inquiry and update facilities eliminate cards and card-handling operations on each job. On-line data entry and editing of stored documentation also eliminates the need for a run book, he continued.

By automating the documentation, the system frees the programmer from both the initial preparation and the equally important, and often equally burdensome, need to update the documentation, the spokesman claimed.

The instructions provided by Jobdoc include assistance to the job setup and control clerk on the one hand and help to cope with Abend/Restart situations on the other.

The system also includes systematic control for disaster planning including identification of critical jobs and their degree of criticality as defined by the user. Part of the disaster support includes creation of a special portable data base to get work started, if required, in a new location.

The package includes Cobol and ALC

'Blis/Cobol' Interfaces Trident Disks, Novas

WINTER PARK, Fla. — The Blis/Cobol operating system has been enhanced to support Trident disk systems as well as other peripherals attached to Data General Corp., Nova and Eclipse systems, according to the Blis vendor, Information Processing, Inc. (IPI).

Among the Trident units supported in this upgrade are the T-25, T-50, T-80, T-200 and T-300. With them in place, Blis/Cobol users can work with indexed files containing up to 16 million records, with 500M bytes each, spanning eight drives, IPI claimed.

The software enables users to retrieve data from the files sequentially, randomly or by

modules in source form for compilation and input to IBM's IEBUPDTE routine; reader-interpreter and analysis modules in object form; and manuals describing the system.

Organizations willing to serve as demonstration points for Jobdoc can have the product installed for a one-time cost of \$17,000. As of Sept. 1, the cost will go up to \$21,500, the Gulf spokesman said from 1775 St. James Place, Suite 160, Houston, Texas 77056.

While Blis/Cobol provides the software interface between the Trident disks and the DG minicomputers, the hardware linkage is provided by Minicomputer Technology 802A controllers.

The multiuser Blis/Cobol operating system includes record-level lockouts to avoid simultaneous updates. Indexes are maintained dynamically to avoid the need for periodic file reorganizations, the company noted.

The stand-alone software system can be used on DG computers with 16K words, but 32K words is a better environment for it, the spokesman said. Blis/Cobol costs \$4,000, he added from Suite 320, 1850 Lee Road, Winter Park, Fla. 32789.

Correction

NEW YORK — Copies of the June 1977 issue of the *SigCSE Bulletin*, cited in "ACM Programmer Curriculum Sets College Guidelines" [CW, June 27], are available for \$2 each, according to the Association for Computing Machinery (ACM), 1133 Avenue of the Americas, New York, N.Y. 10036.

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Survey Flaws Seem Obvious... But Challenges Have Flaws Too

By Sam Levine

Special to Computerworld

In "New Ideas Sought to Bring Order to Package Surveys" [CW, Apr. 4] Don Leavitt raised pertinent questions concerning the value of the Datapro Honor Roll. He said the statistical sample used in rating the packages is too small and the honor roll only benefits those vendors "elected" to it. I agree on both counts.

One factor the article didn't address is the validity of the questions used to rate the packages. Specifically, Datapro's seven questions deal with overall satisfaction, throughput/efficiency, ease of installation, ease of use, documentation, vendor training and vendor technical support.

The respondee is asked to assign a weighted value to each question based on a 4.0 perfect scale — just like college grades. Unlike college grades, however, the scores are not based on an accurate measure, but rather on the opinion of the person answering the questionnaire.

There is no guarantee that person is the primary user of the package; consequently, he may not be in a position to accurately grade it. In addition, since the "grades" are purely subjective, I dare say they'd vary greatly depending on the mental frame of the person when he is answering the questionnaire.

The Datapro questions themselves are also ambiguous. What does "overall satisfaction" mean? Can a user really judge "throughput/efficiency" without accurately measuring it?

"Ease of installation" also puzzles me. Just about every vendor I've talked to will install the package (IBM is a large exception). So why would anyone care about how easy or hard it is to put the package on the computer? If Datapro means "ease of installation" to be a measure of machine time to install the package or program modification effort, it should say so.

The remaining four questions — ease of use, documentation, vendor technical support and vendor training — are equally ambiguous and misleading. Shops might have greatly different opinions concerning how easy a package is to use, how clear the documentation is or how good the vendor training was depending on the quality of the user's staff. As for technical support, well, vendors are only as good as their last performance.

Levine is a consultant in New York.

Card Readers Tied To MDS Series 1200

PARSIPPANY, N.Y. — Mohawk Data Sciences Corp. (MDS) has enhanced its System 1200 data entry/communications software to support the use of card readers as well as keyboards for input operations.

The changes have been included in both the stand-alone Key-Display Operating System (KDOS) for data entry and the "Concurrent" version, which allows communications functions to proceed at the same time, according to a spokesman.

The upgrade lets users move data from a card reader directly to the system's disk file, eliminating tape transfer operations, or directly to a communications line to a host mainframe, he explained.

With the enhanced software in place, the user can attach either a Mohawk Model 2453, which has a top speed of 400 card/min, or the 2455, which can operate at 1,000 card/min, he added.

Communications with the mainframe is handled under IBM's 2780 or 3780 protocol. System 1200 also allows users to transmit data from disk or tape under those protocols or under 2968 protocol and to receive data on tapes, disks or printers.

MDS is at 1599 Littleton Road, Parsippany, N.J. 07054.

By Don Leavitt

Of the CW Staff

In fairness to the work Datapro puts into gathering its user ratings of proprietary software, I think Levine deserves a response.

Contrary to his understanding, for example, I have no gripe with the size of the statistical sample the researchers use. They send questionnaires by first class mail to 30,000 individuals drawn from a list indicating they have a substantial interest in DP. Even if half these recipients are not from using organizations, the base itself seems adequate.

I am concerned, however, about the minimal number of ratings they accept as a basis for possible inclusion on the Software Honor Roll. With the wide distribution of packages today, it is wrong to let as few as half a dozen raters "make or break" a package.

Happily, most of the 1976 "winners" had many times the minimum number of good ratings to qualify. Yet precisely that fact should encourage Datapro to boost its requirement in this respect.

DP Community Benefits

Incidentally, vendors "elected" to the honor roll are not the only beneficiaries. The whole DP community gains if the vendors compete — through enhancements, not handholding — to make sure their products show up well on such an open forum.

On the details of the rating scheme, Levine is right — they are subjective. If there were some accurate and objective measures, there'd be no need to check user experience. The basic problem, I think, is that installations and what they try to do with packages vary widely, and standard measures just don't apply.

But by gathering and averaging a good number of individual, admittedly subjective ratings, I think Datapro can come up with reasonably valid ratings on how well a product measures up in a typical (whatever that means) situation.

The real problem, and one that Levine recognizes too, is that Datapro has no control over who actually answers the questionnaire. I'd like to see a good solution to that one.

I agree the questions are ambiguous, but for the same reason the ratings are subjective: we have no fixed metrics applicable to software. Despite possible disagreement over detailed meanings of any term, however, most of us can appreciate the basic meaning of the final scores.

Because they are averaged, they probably reflect how well a package does in a typical situation. And it probably is reasonable to compare ratings of competing packages to see which seem worth evaluating in depth.

Any survey that can help users that much has to be a welcome addition to the community.

XCS Offers Price Break On Distributor Service

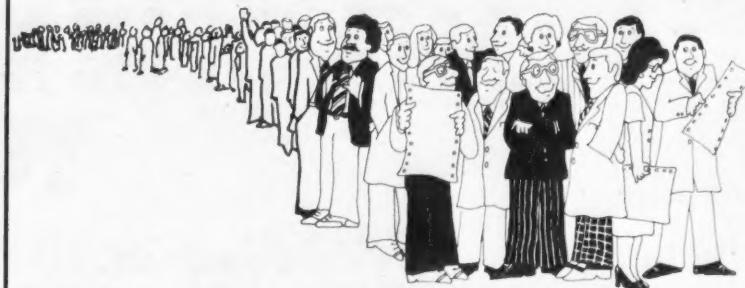
EL SEGUNDO, Calif. — Xerox Computer Services (XCS) has reduced prices approximately 10% on the Xerox 1-2-3 System, an on-line service for wholesale distributors. Cost of the service can be as low as \$750/mo, according to a spokesman.

The 1-2-3 System provides integrated order processing, inventory control, accounts receivable and sales analysis applications for distributors with annual sales as low as \$500,000, he explained.

The \$750/mo figure is a minimum charge for use of the system but seems to apply to many of the users on this "start-up" service, he added.

XCS provides remote computing network facilities throughout much of the country and is headquartered here at 701 South Aviation Blvd., El Segundo, Calif. 90245.

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COMMUNICATIONS

Data Briefs

Metric Publication Lists Test Equipment

BURLINGAME, Calif. — Metric Resources Corp. has published an eight-page brochure covering rental and lease of telecommunications and electronics test equipment.

The brochure lists more than 400 model numbers, descriptions and monthly rental rates of test sets for data communications, computer/protocol, carrier, cable fault locating, microwave, mobile communications and video equipment, according to the firm.

A separate section presents a brief economic analysis of the user's "rent vs. buy decision," illustrated with a graph of effective monthly equipment expenses.

The brochure offers a convenient listing of equipment available, but does not offer in-depth product descriptions.

Metric Resources is located at 822 Airport Blvd., Burlingame, Calif. 94010.

Lear Cuts ADM-3 Price

ANAHEIM, Calif. — The Data Products Group of Lear Siegler's Electronic Instrumentation Division has dropped the price of ADM-3 Dumb Terminal \$100 and included a once-optional feature in the lower cost.

The base price is now \$895. In addition, the 24-line, 1,920-char. display capability, formerly an option at \$250, has become a standard item, according to the firm.

TCTS Expands Service

OTTAWA, Ont. — Four serving areas have been added to The Dataroute, the digital data network provided by The Computer Communications Group of the TransCanada Telephone System (TCTS).

The addition of Brantford, Chatham and St. Catharines in Ontario and Charlottetown in Prince Edward Island on July 1 brought the number of Dataroute serving areas to 36.

For Business Users

Datacom Inaugurates Usage-Sensitive Net

By John P. Hebert

Of the CW Staff

MEMPHIS, Tenn. — The Datacom Co. based here is offering a usage-sensitive data communications network alternative for business users which reportedly can interface any terminal protocol.

The nonprofit wholly-owned subsidiary of Data Communications Corp. (DCC) here operates a nonregulated national packet-switched network service which converts users' terminal-to-CPU data communications into a standard speed and code format. The service utilizes microprocessor-based communications

controllers developed by Datacom and Universal Data Systems, Inc., according to a Datacom spokesman.

Any users opting for the full-duplex transmission network service can save money compared to the costs of using any other carriers' network, he claimed.

The network uses leased, unconditioned voice-grade lines from AT&T to transmit users' data at 4,800 bit/sec, he said.

Because the network was originally developed for — and is still shared by — users of the parent company's Broadcast Industry Automation System (Bias), business users are

given a discount on data transmitted between the hours of 8 p.m. and 6 a.m. the following morning, according to the spokesman.

Datacom transmits users' data in 132-character packets. Subscribers are charged to transmit kilopackets of data anywhere in the continental U.S. at a rate of \$1.70 per kilopacket during the daytime hours (between 6 a.m. and 8 p.m.) and \$.85/kilopacket at night, he said.

Users, however, are not restricted as to when they are able to access and use the network facilities, the spokesman explained.

To access the network, users must either buy or rent a microprocessor "black box" from Datacom for \$2,000 or about \$100/mo on a one-year lease, he said.

Procuring a line interface between the users' terminal or CPU and the network nodes in 85 U.S. cities is up to the user and is not an extra network cost, according to the spokesman.

The company guarantees users their buffers will arrive at destination; and the network also offers other features, he said.

Datacom may upgrade the network to operate at speeds above 4,800 bit/sec if there is a need, he said, adding the company is looking into the possibility of changing from voice-grade lines to Bell's Dataphone Digital Service digital line offering.

The Datacom Co. is located at 3000 Directors Row, Executive Plaza, Memphis, Tenn. 38131.

For January Operation

ITT Readies Shared User Network

By John P. Hebert

Of the CW Staff

NEW YORK — ITT Corporate Communications Services, Inc. (ITT-CCS) late last month received approval from the Federal Communications Commission (FCC) for an interstate common carrier service for primarily voice but also business data communications users.

In addition, CCS has already installed the first and largest of its planned nationwide computerized telephone and data switching centers here for what it calls the Switched Private Network Service (SPNS).

CCS filed with the FCC in May 1976 for SPNS, which is aimed at low- to medium-sized users.

Its Corporate Communications Switching Equipment (CCSE) offering for large-volume users did not require FCC approval [May 31, 1976].

The company expects to launch the two services by Jan. 1, according to a CCS spokesman.

SPNS will provide four-wire switched private line facilities on a dedicated subscriber-to-subscriber basis utilizing ITT-CCS switches and shared-user, leased transmission lines between cities, the company stated.

Since the SPNS network lines are leased from other carriers, CCS will guarantee 4,800 bit/sec transmission for data users, the spokesman noted.

SPNS features will include privacy, detailed per-call billing, traffic statistics, desk-to-desk dialing, abbreviated dialing, hotline service, conference calls and project billing for specific subbilling accounts, according to CCS.

Voice-grade telecommunications services will

be provided through the SPNS network switching-center and tariff-extension cities, which will include Atlanta, Baltimore, Boston, Chicago, Dallas, Los Angeles, Milwaukee, New York, Philadelphia, San Diego, San Francisco and Washington, D.C., according to a CCS spokesman.

ITT's seven proposed switching centers in the system are designed to provide users with network management controls of line and trunk equipment on a real-time basis, he said.

CCS anticipates filing rates with the FCC for (Continued on Page 25)

'Calrs' Diagnoses Phone Faults

HAMILTON, Ont. — A service operator for Bell Canada here responds to telephone subscriber trouble calls by using a Westinghouse Canada Ltd. W1600 CRT terminal to input the subscriber's telephone number into Bell's Centralized Automated Loop Reporting System (Calrs).

Calrs is designed to reduce to minutes the time required to diagnose and take corrective procedures on customer telephone or telephone line problems.

Mini Technology

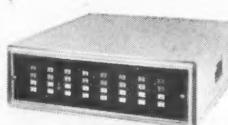
The system uses minicomputer technology to store and retrieve information and to perform up to 15 measurements plus operating checks to diagnose faults in customer equipment, according to Westinghouse.

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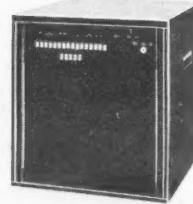
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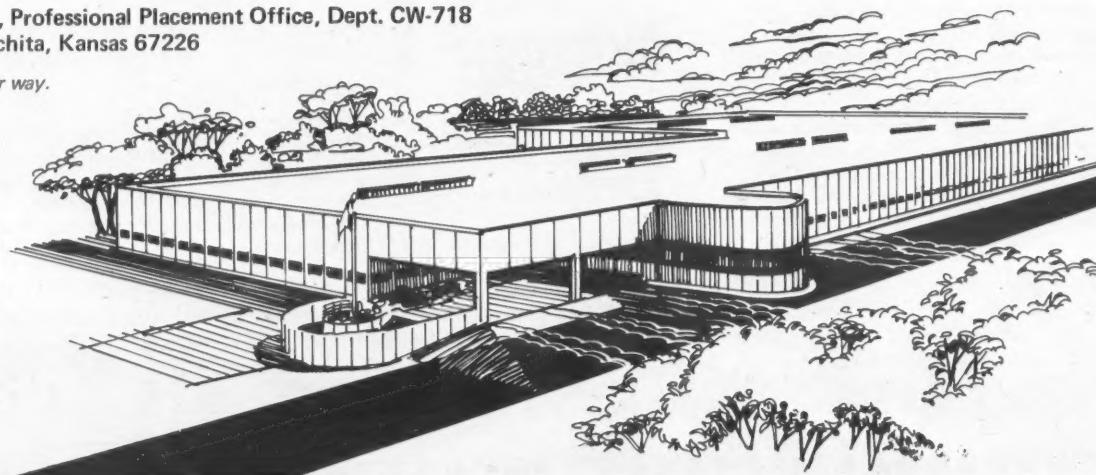
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Firms Set Sights on Competing With IBM High-Capacity CRTs

By John P. Hebert
Of the CW Staff

DALLAS — Shortly after IBM announced a 3,440-character-capacity screen for some 3270 series CRT terminals, Four-Phase Systems, Inc. and Harris Corp. tested their competitive reflexes and met the mainframe's challenge.

At last month's National Computer Conference here, Four-Phase demonstrated an operational IBM 3270-compatible CRT with the 43-line by 80-char./line display format. The terminal was operating as part of a live demonstration of the company's stand-alone System IV/70 operating with IBM 3270 simulation software, according to a company spokesman.

Four-Phase was demonstrating the large-capacity CRT solely as a competitive response to IBM's announced intentions. The terminal does not yet have a model name, price or delivery schedule, the spokesman stated.

The company also did not research the ad-

vantages or disadvantages to users of the 3,440-character display, the spokesman admitted. He said it did, however, alter the necessary electronics in the terminal within two weeks after IBM announced the model 3276 and 3278 additions to the 3270 CRT family [CW, May 23].

Harris also announced a large-capacity 3270-compatible CRT terminal, but did not show its engineering prototype to NCC attendees.

IBM's 3276 and 3278, however, have not been shown or demonstrated publicly. The terminals will not be available until well into 1978, according to IBM.

According to the Four-Phase spokesman, his company has no obligation to manufacture or deliver such a terminal to users until IBM does so.

The major reason for producing 3,440-character terminals, an industry source pointed out, is to display the contents of one standard typewritten, single-spaced page on the CRT screen.

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ITT Readyng Net For January Startup

(Continued from Page 23)

the SPNS services late this month or in early August, the spokesman said.

"Typical rates which might be expected" were filed with the FCC last year with the SPNS application, but the "whole world of communications has changed since that time," he pointed out.

Basically, SPNS users can expect to pay a monthly service charge, a one-time installation charge and a user charge varying with distance of network services, in addition to supplying their own modems, according to the spokesman.

Last year, the proposed, tentative charges filed with the application to the FCC showed a local access charge of \$30/mo per channel with an \$85 one-time installation charge. Usage charge per port was expected to be a minimum of \$120/mo.

Beyond the minimum rates, the 1976 CCS application referred to eight categories based on distance and time SPNS is used ranging from 3 cent/min from one to 400 miles up to 39 cent/min at distances over 2,500 miles [CW, May 31, 1976].

These charges, however, could be much higher or lower than rates SPNS users will be charged when the network is operational, the spokesman cautioned.

The company's second offering, CCSE, will provide the user only with access to the high-volume-capacity switching equipment.

It will require that a large user contract for the use of a minimum number of ports; billing will be based on a monthly per-port charge plus a one-time installation charge for each port used, CCS said.

In 1976, the minimum number of ports was expected to be 96, the installation fee \$60/port and the monthly charge was \$120/mo port [CW, May 31, 1976].

CCSE will allow large telecommunications users to custom-design their own network using the ITT-CCS switching equipment in conjunction with transmission facilities they own or lease from any other common carrier.

CCS is located at One Whitehall St., New York, N.Y.

Pacer 103 Gets Interface

RIDGEFIELD, Conn. — Digitech Data Industries, Inc. has announced an interface option which reportedly allows their Pacer Model 103 data line monitor and simulator to operate on 50 kbit/sec circuits.

The interface consists of two adapters which connect to the modem and terminal side of the line, the company said.

The pair of adapters costs \$995, Digitech said from 66 Grove St., Ridgefield, Conn. 06877.

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Storage Capacity Up 75%

Arkansas 'Promoting Deflation' With Disk Upgrade

LITTLE ROCK, Ark. — "It's ironic; we're actually promoting deflation," according to James T. Randolph, director of Arkansas' department of computer services. Randolph was discussing the state's disk storage equipment.

With the installation of Memorex Corp. 200M-byte disk drives to replace the previous 100M-byte drives supplied by IBM with the state's two 370 CPUs, storage capacity of the disk subsystems has been increased by 75%, while floor space requirements have been reduced by over 50%, Randolph said.

At the same time, the state is able to charge all of its agencies 5% less for central DP services, he said, noting that with the expanded capacity, tasks such as a new sales tax application can now be added to the system.

A detailed 30-day study by an evaluation team of computer technicians ultimately led to the decision to award a contract to Memorex for its Model 3675 200M-byte disk storage drives, according to Randolph. In response to the state's request for proposal to four vendors, three responded as willing to undergo evaluation tests in accordance with the 95% availability requirements then set by the state department of computer services, he said.

Limiting Factors

Managers at the state's DP facility had several constraining factors affecting the decision to upgrade the disk subsystem, including limited floor space and an air conditioning system already at its peak, Hall explained. In addition, the new equipment had to meet the 95% availability criterion, allowing only 5% downtime for all maintenance, including preventive maintenance, over the 30-day test period.

In more recent months, the state has increased the availability requirement for all of its DP production equipment to 98%, a requirement the disk subsystem has also met successfully, according to a Memorex spokesman.

The state's disk storage subsystem, which is shared between a 370/158 and a 370/145, both of which operate under Release 6 of OS/VS-1, consists of four strings of Memorex 3675 disk drives and 3673 controllers. Interfacing between the Memorex strings and the IBM processors is accomplished through a pair of Memorex 3672 storage control units.

Total capacity of the 28-spindle subsystem is 5.6 billion bytes. The predecessor disk

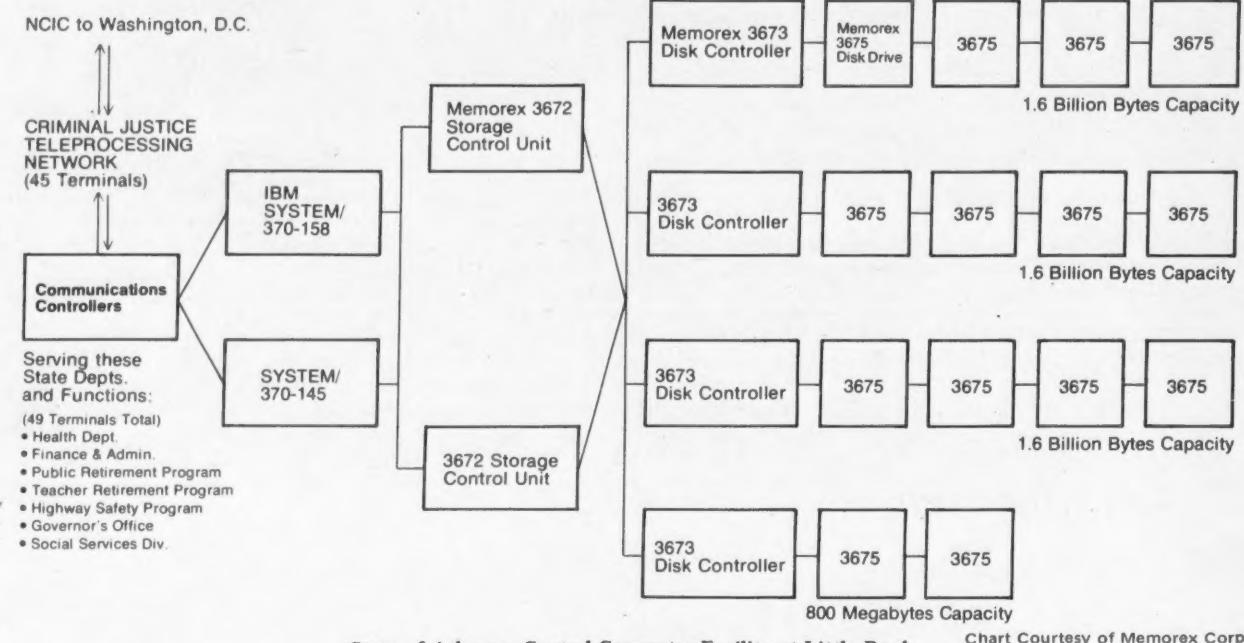


Chart Courtesy of Memorex Corp.

State of Arkansas Central Computer Facility at Little Rock

subsystem, consisting of 32 IBM 100M-byte disk drives, had a capacity of 3.2 billion bytes. Air conditioning requirements for the Memorex equipment remain about the same as for the replaced drives, Hall indicated.

The Memorex drives were introduced to the facility gradually, according to Hall. At first, one string of eight spindles were installed, and at two-week intervals the remaining three strings were added. The four 3673

disk controllers are connected to the two 3672 storage control units. All of the drives are switchable between both CPUs for maximum system reliability, he said.

"We can perform string switching between CPU channels and switch control units as well," Hall explained. "That is, if one controller develops problems, the other one is switched to carry more of the load. This capability ensures that we never lose an entire portion of the disk subsystem."

Each 3672 has the capability to read all units in the subsystem."

The emphasis on reliability and backup has been maintained largely because the system serves the state's Criminal Justice and Highway Safety Information Network. This network operates 49 terminals located at state and local police departments and at the state's Criminal Justice Division, and it connects to the National Crime Informa-

(Continued on Page 30)

Long-Range DP Planning Seen Business Challenge

DALLAS — Users of "information resources" need to do more long-range planning, but such planning will "challenge some basic ways we do business," Harvey L. Poppel, a consultant with Booz, Allen & Hamilton, Inc.

Maybe such planning will even cause some organizational changes, according to Poppel.

Information resources encompass much more than just DP, Poppel contended, noting "our professions go beyond the computer itself and encompass all the information resources of a firm."

In the 20 years of computer use, he said

the technology had moved forward at a "startling" pace, but the ability of manufacturers to change that technology into products has lagged.

"But even more importantly, the ability to manage the technology has lagged way behind both the technology and the ability of manufacturers to translate that technology into products," Poppel said.

There are seven basic reasons for this, Poppel stated. There has been a failure of the people using the systems to understand the business they are in and a failure to grasp the total problem in using information resources.

In addition, DPers have failed to adequately explore alternatives, properly estimate development efforts in the area and properly anticipate the resistance to such projects, Poppel charged.

Finally, there has been a failure to gauge the impact of information resources and a failure to control the results of information resource efforts.

Today, users are facing an even "more difficult environment" where DP, communications processing and word processing are all interacting and affecting "human processing" within organizations, Poppel suggested.

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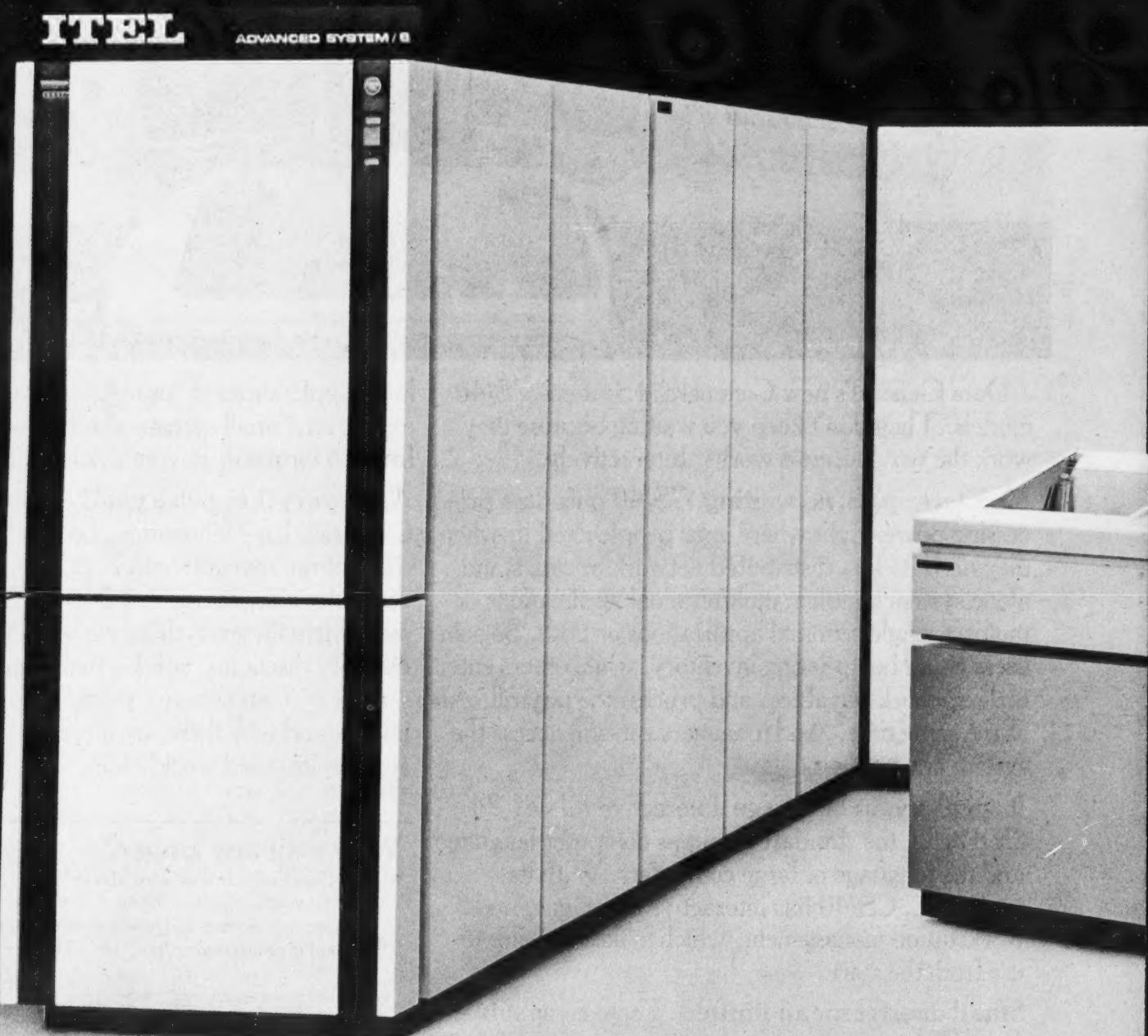
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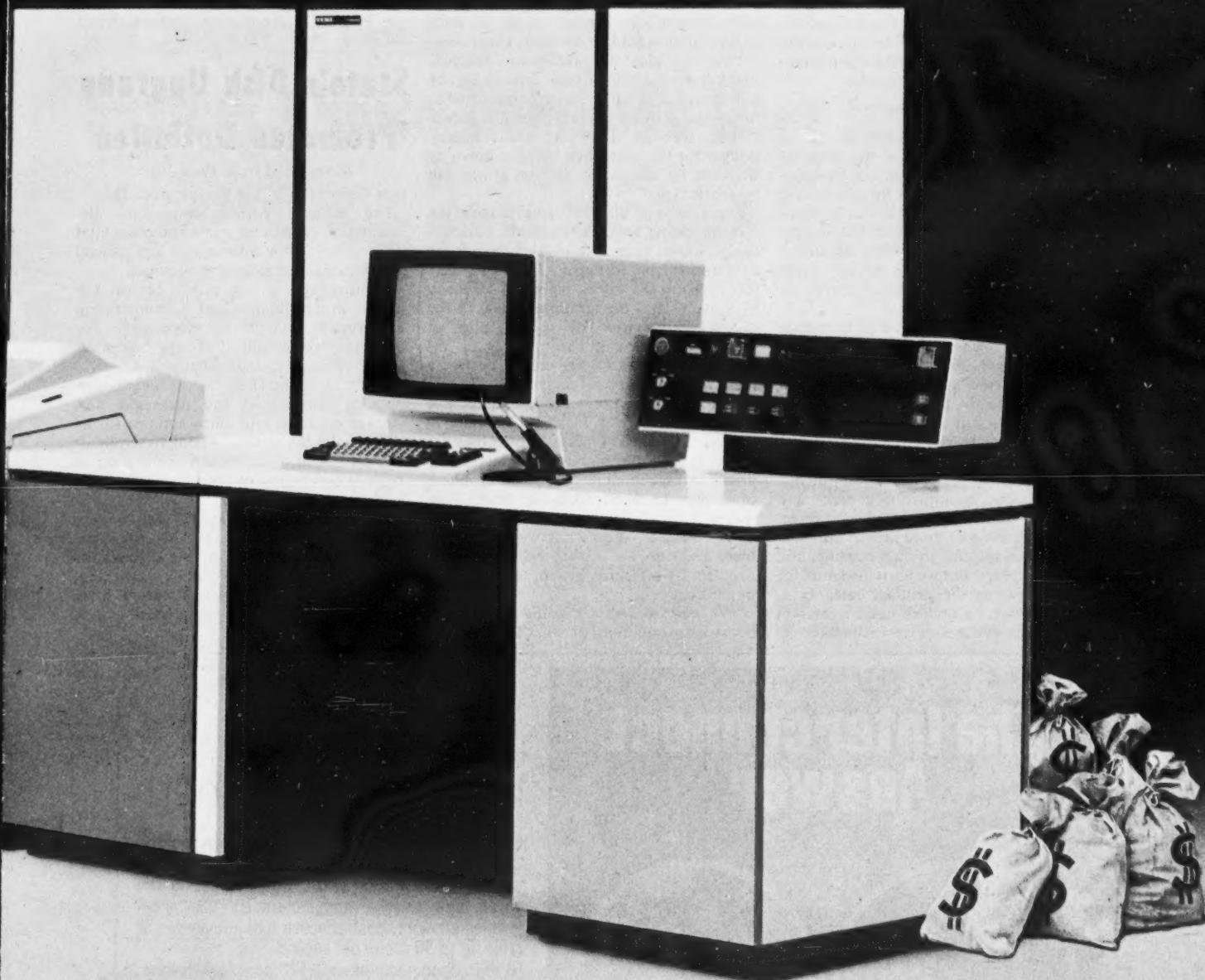


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Inquiry System Helps Firm Style Product Line

MERRIAM, Kan. — A terminal-based inquiry system is helping the H.D. Lee Co., Inc. plan, monitor and react to the ever-changing needs of the apparel industry. The system meets these needs by allowing personnel to access files and ask spontaneous questions regarding all aspects of the company's clothing business.

With other systems, a program has to be written and stored for each specific question that is to be asked and answered. But with the system Lee uses, IBM's Interactive Query and Report Processor (IQRP), there is virtually no limit to the type and variety of questions: if the facts needed to answer them are on file, the system provides the answer in about 20 seconds. This can lead to another question, another answer, etc., in a conversational "what if" sequence, if desired, according to Peter D. Day, manager of merchandise planning.

To ensure that those facts are there for merchandise planning, for example, Lee has developed a file of sales history for previous seasons. Each lot number has been identified by some 20 variables. The system permits Lee management to look at trends by one or any combination of these variables. Also stored is data on the current season, including sales, forecasts, production quantities and a projection of sales data.

Clearer Picture

With this information available to be shuffled and manipulated as the terminal user wants, the system gives Lee management a view of the overall merchandising structure and complexity that was impossible to achieve before, Day said. It also provides a capability to survey and define, to clarify specific merchandising objectives and to analyze whether these objectives are being achieved.

"In the apparel industry we all recognize that mistakes lead to expensive obsolescence," Day said. "But since IQRP was implemented in the spring of 1976 it has helped us make the positive decisions that generate profits, not mistakes," he added.

"For example, if we are to do the most effective job of planning our product line, making our piece-goods commitments, gearing up our manufacturing plans and sending our salesmen off in the right directions, we must have a good idea of how successfully each specific product classification sold in past years. But we must also look for ways of defining the product category in terms of what we believe current market conditions will be, not as we would have de-

fined things two years ago," Day explained. "Through its flexibility, IQRP enables someone like me who knows nothing about DP, to sit at an IBM 3270 video display terminal and interpret history so that we can redefine each marketing classification as it should be today. This was impractical to do manually," he noted.

"In short," Day said, "in preseason planning, the system enables us to formulate overall sales goals by product categories and give merchandise assignments, by type and quantity, of product needed to yield the desired goals by line."

Further, the data enables Lee personnel to develop a detailed merchandise planning report. It is set up by fashion group and within each group, by a breakdown of units, percentage to total for the season, count and yield — by month for the past six seasons, then the forecast for the next two seasons.

Lee managers can look at these figures over time and make a forecast through the next season by fashion group and by total for the division. Fashion groups change, of course, and IQRP enables Lee to change with them easily. Trying to do so with manual data would be difficult, Day noted.

"We can also do price-point analysis, breakdown fashion group forecasting by fabric type and tell the merchandiser what his budget is by each fabric type," he added. "Thus, we can start with the company budget for the year, then break it down by division, by season, by fashion group and by fabric type."

The system is also of value outside the merchandising area. For example, purchasing personnel needed to make a long-range commitment on corduroy. Therefore, Day just keyed in the words "subtotal corduroy by season" and the terminal displayed the needs companywide by season, plus an 18-month history of corduroy usage. By looking at trends, he could derive a reasonably accurate forecast.

In addition to preseason planning, Lee personnel use IQRP in season, mainly to summarize it into "blocks," which they use to compare with planned production by group and see immediately where problems of under- or overforecasting exist. Then they can turn again to the system and see, by lot number, specifically where the problem areas are — or they can look at the problem by a fashion group, fabric or type of garment.

"We can see what's going strong and boost its production, or what isn't and cut

its production," Day said. "The system can also produce 'exception' data, such as a list of all items exceeding projections by 'X' percent, or falling below projected sales by 'Y' percent. The printout is generated by our IBM 370/158 and delivered to the planning department within about 30 minutes," he indicated.

"However, IQRP is not simply exception reporting," he claimed, "because it enables us to look at everything we want to. It's more of a management screening device. If you build the information file right, and we think we have, its potential is tremendous."

All data bases are updated at least weekly and some of the files, such as customer inquiry information, are updated daily. IQRP is also used:

- To produce accounts receivable data — such as the top 10 accounts in terms of purchases or a listing of those with certain credit problems.
- For checking raw material receipts, typically to be certain they will meet production planning needs.
- For order status, usually on the day's expected shipments.
- By the DP department to check stored prices.

State's Disk Upgrade Promotes Deflation'

(Continued from Page 26)

tion Center (NCIC) in Washington, D.C. The network permits immediate dissemination of data on crime and other vital data related to law enforcement and judicial activities, according to a spokesman.

Another user of the state's central DP facility is the Finance and Administration Department, which is responsible for budgets, accounting, drivers' licenses, motor vehicles, taxing and payroll.

Addition of the IBM IMS software, now possible because of the increased disk storage capacity, will allow support of the state's sales tax system. About 10 terminals will be installed for inquiry, correction of records and review of revenue accounts, he said.

Still other departments and functions supported by the facility include the state Social Security Division, the Governor's Office, the Teacher and Public Retirement Programs, Highway Safety Program, State Treasurer's Office and the Department of Corrections.

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Textile Rental Companies Cooperate on Mini Venture

By Esther Surden

Of the CW Staff

INDIANAPOLIS — It's sometimes difficult for a small business person operating within the confines of his specialization to find a DP system that fits his needs from among those offered by traditional minicomputer vendors.

So Commercial Towel and Uniform Service, Inc., here, a textile rental firm, took a different approach, according to Theodore Kline, vice-president.

The firm turned to a consultant familiar with both DP and the particular needs of the textile rental industry and then, with several other firms, underwrote the development of a turnkey system designed to fit textile rental industry's needs.

Each of the firms put up \$25,000 to develop the small business system, in a venture that seems to have paid off well for the companies involved.

The mini was just recently installed, Kline

noted, and is currently running only the route accounting and accounts receivable application. Future applications that should be running shortly include management information and payroll, Kline added.

Firm's Automation Roots

Like many small businesses, Commercial began automating its office with the installation of tabulating equipment some 15 years ago. Like others, the firm outgrew this equipment, so Kline began looking around for an alternative.

Although an industry-specific service bureau does exist, the firm thought it "expensive and not flexible" to take this route and so Commercial decided on an in-house system, he said.

But the expense of an in-house system configured exactly to the firm's requirements would have been exorbitant.

Commercial wasn't sure what to do until it turned to Markman and Associates of

Bala Cynwyd, Pa., which specializes in DP consulting in the textile rental field. The consultants, Herbert Markman and Edward J. Keegan, had a reputation in the industry, Kline noted.

They suggested pooling resources with four other small firms to come up with a system, Markman explained. It seemed like a good idea, so the five companies got together to determine some general criteria for their system.

First, they wanted a system that would not only be adequate for present needs but would be expandable without reprogramming. The system also had to use state-of-the-art equipment, because none of the textile rental firms wanted to outgrow it too quickly or find it obsolete as soon as it was installed.

All of the companies wanted the mini to be easily operated by present employees.

The selection of a vendor was left up to

the consulting firm. "We have no one on our staff who has that kind of expertise," Kline explained.

The consulting firm then began its consideration of minicomputer gear. "We did a survey of vendors," Markman recalled, and the list was narrowed to either Hewlett-Packard or Data General Corp. because, among other reasons, "we wanted a financially sound vendor, someone who could give us a consistent supply."

HP "was not price-competitive at that time," he noted, so the firm chose a DG Nova 3 CPU with 92M bytes of disk, a 300 line/min printer, magnetic tape unit and three CRTs.

The installation at Commercial includes a 96K Nova 3 CPU with 92M bytes of disk, a 300 line/min printer, magnetic tape unit and three CRTs. The system handles about 6,000 customers. When completed, it should provide the firm with information about customer history according to route, plant, customer, service detail and items served, he said.

It will also generate reports such as contract renewal reports, customer analysis reports, general ledger, sales analysis, items served, and a new and lost business report.

It also interfaces to industry packages sponsored by the Linen Supply Association of America. One called Computer Assisted Route Development runs on a Control Data Corp. system at the association and is a system for structuring route and optimizing truck routes to minimize time and mileage. The turnkey system produces a tape that interfaces with this system.

The Turnkey — Part 1

System Choice Demands User Initiative

By Vincent Deschamps

Special to Computerworld

When it comes down to the bottom line, the responsibilities for the installation of a minicomputer-oriented system ultimately rest with the user.

It is the user who has more to lose than anyone else who may be involved in the selection and installation of a mini-oriented, "turnkey" business system. It is the user's business that is at stake. And, for the most part, it is the user who knows the least about which system is right or wrong for the business applications he wishes to automate.

This is the first installment of a three-part series dealing with successfully installing a turnkey minicomputer. Next week's installment, also addressed to first-time users, will detail the selection process, contractual arrangements, implementation procedures and schedules.

Remember, a vendor knows little about your particular business. If it claims to have a "do-all" system for everybody, be suspicious. This may represent a seller's motivation — not necessarily a buyer's solution.

Keep your eyes open wide. Here are some rules to help keep you out of the "divorce court."

Potential users should cling to real-world situations. Avoid positions, thinking or statements that your predecessors have made, such as: "I told those computer people I didn't know anything"; "I expect this computer system to do everything in the world"; "The salesman assured me my computer would never run down"; and

"Why can't we transmit data via satellite from New York to New Jersey?"

Minicomputer vendors prefer to sell only the systems they've developed, often disregarding users' hardware and software requirements.

Because of the relatively low price of minicomputer systems, as compared with the price tag for more powerful mainframe configurations, "off-the-shelf" systems provide manufacturers with the profitability and simplicity needed for effective marketing.

Customized systems represent add-on costs and a possible trap for the manufacturer to end up building unique systems. With the rise in price to include user options or specialized hardware and software, a custom system can end up like Mr. Blanding's dream house — costing as much as or more than a large system.

The right hardware may not be the cheapest. Hardware should be evaluated after the user analyzes his own business applications and volumes.

Another user trap may be either the underengineered or overengineered minicomputer system. It fails to live up to vendor salesmen's promises or loads the user up with gear he doesn't need now or in the foreseeable future.

The user also occasionally falls into the "Numero Uno" syndrome. Impressed by the size and reputation of the giant, he feels safe in selecting No. 1's gear, which may end up giving the user the biggest headache. The giants shy away from turnkey, total responsibility systems.

Distributors of minicomputers now offer only one manufacturer's product to the end

user. It is not unusual for so-called turnkey systems to suddenly, after installation, require additional, expensive software or add-on peripherals to meet user requirements.

It's your business. An unsuccessful installation can put a user out of business. It's difficult and expensive to convert from an in-house system back to your previous system.

(Continued on Page 33)

Datapro Report Tackles Mystery Of Implementing Small Systems

DELRAN, N.J. — A 14-page report "designed to take the mystery out of acquiring and implementing an effective small business system" is available from Datapro Research Corp.

The report provides an introduction to small business systems and practical advice on justifying, selecting, manning, installing and converting to the units.

For example, users are often confused by specifications such as processor speed given by manufacturers. "The critical factor for judging a business minicomputer's useful speed is usually the speed at which the input and output devices operate, because the processor can operate far faster than you can either enter the data or see the results printed," the article advised.

Business people shouldn't be lured to a small business system just because the business's competition are all getting one, the report continued. If the system can help out in an area that is "chronically over

budget, late in meeting schedules or effectively operating without management control," a minicomputer can be of help, the researchers noted.

Call References

"By all means, call the companies on the vendor's reference lists," the report continued. It suggested a list of questions to ask, including "Were the programs delivered on time?" and "Is the servicing of the equipment prompt and effective?"

Take the system for a test drive and insist on making some postings yourself, the report advised. That way you can find out if it is easy to operate and lets you correct mistakes easily.

The report also covers such topics as the rent/buy decision, requests for proposals, feasibility studies, vendor selection and converting to the system. It costs \$12 from the firm at 1805 Underwood Blvd., Delran, N.J. 08075.

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Switch From Service Bureau Saves City \$2,700/Year

By Esther Surden
Of the CW Staff

CARIBOU, Maine — The city of Caribou is saving an estimated \$2,700 yearly in service bureau fees and has cut part-time personnel with the installation of a small business system.

The city, with a population of 11,000, needed a system to perform its tax assessment billing application, a complicated task that had formerly been handled

manually, according to Terry St. Peter, city manager.

"We looked at several small machines," he said, including systems from Burroughs, NCR, Olivetti and Digital Equipment Corp. The city also looked at IBM, but less closely than the others, he indicated.

"We looked at hardware and software together. We had no computer programming capability here, so we needed to buy pack-

ages."

"The DEC Datasystem 310 seemed to be the closest thing to an IBM 3 but for less cost. It seemed to have the advantage of flexibility but on a basis that we could afford," he said.

Turnkey Vendor

The city got its system through a turnkey vendor, Datasystems of Maine. "They were just starting up at the time we started this venture. I believe we responded to some circular. We have never had any direct dealings with Digital," St. Peter said.

Prior to the installation of the system, the city had hired an extra part-time person assigned to help with the tax assessment chore.

The clerk helped the existing office staff type the evaluation books, then followed that up by typing the bills one at a time — all 5,000 of them.

"Then we had to type a collec-

tion book," which records the receipts from the taxpayers.

Now the system takes care of the entire application from start to finish, according to St. Peter.

The city is also performing a payroll application for the municipal employees and the school district on the small system. Previously, although the city was responsible for the school department's payroll, it was contracted out to a bank to be done on its computer.

"We did our own municipal payroll of 90 employees by hand," St. Peter said.

Both payrolls are now handled by the small business system via two payroll packages bought from Datasystems. It covers about 330 people on the city's payroll.

The city plans to put additional applications on the system and is training one of the city workers at DEC's programming school.

"We would expect to still buy

packages, but I'm hoping that this will give us the capability to make some changes and maybe do some small programs here," St. Peter said.

A voter registration package is on the agenda to be placed on the system as soon as it is programmed in-house, he added.

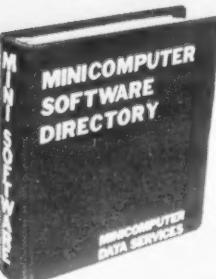
"The sewer district is now purchasing a sewer billing package for use on the system as well," he noted.

Slow and Careful

"We have really gone about this slowly and carefully. We recognized we were on the ground floor with this software house that was just beginning; and we have really had to make some changes in order to develop the system to our satisfaction with their cooperation," St. Peter said.

It took a little longer than anticipated, he noted, but presented no real problems to the city.

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After Lightning Strikes

User Mixes Memory From Independents

By Frank Vaughan

Of the CW Staff

UPLAND, Ind. — Officials of a university computing center here are operating their minicomputer with add-on memories from two different outside vendors following a lightning strike that crippled the system last summer.

As a result of that lightning incident, Taylor University's Digital Equipment Corp. PDP 11/40 is currently operating with 28K words of DEC core, 32K words of Cambridge Memories, Inc. and 32K words of Fabri-Tek add-on, according to John Kastelein, director of the computing center.

The university purchased its 11/40 in November 1973. The mini came configured with 28K of core and operated in that configuration until the summer of 1975 when the decision was made to use DEC's RSTS-E operating system, he said.

RSTS-E required 30K of memory, so the university purchased 32K from Cambridge to facilitate the operating system, he noted. No difficulties were encountered with the Cambridge add-on until the lightning strike crashed the system in June 1976.

"We had a DEC repairman come in and he worked on the system for three or four days and finally fixed the equipment. The Cambridge memory was knocked out, so we shipped the boards off to Cambridge and resigned ourselves to the fate of not being able to run our RSTS-E until they came back," Kastelein said.

Deadlines Closing In

One week after the boards were sent back, the Cambridge plant closed, because of financial difficulties, leaving the university with no memory, no commitments and no hope of meeting the requirements for grades, billing and registration deadlines that were drawing near.

"Since we had no idea what was going to happen at Cambridge, we made a commitment to purchase 32K from Fabri-Tek, providing they could loan us a system until they could ship a permanent replacement," Kastelein said.

"Fabri-Tek came through with

the memory for us and we were on our feet again," he said.

Meanwhile, Cambridge Memories reopened and returned the lightning-struck boards to Taylor. The boards didn't work, so this time Kastelein shipped back boards, cage, power supply and everything, he said.

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Micos II for Small Businesses Uses 'Proven' System Software

ELMSFORD, N.Y. — Minicomputer Systems, Inc. has introduced a lower cost version of its Micos small business system.

The Micos II is "a stripped-down version" of the larger Micos system and is designed to satisfy user requirements for a flexible system with proven systems software as well as applications, the vendor said.

It is said to be comparable to the Microdata Corp. Express and IBM System 34 and can accommodate high-speed data transmission either from terminals or in system-to-system networks.

The basic system includes a 65K Data General Corp. Nova 3/4 CPU, a 10M-byte disk drive, line printer, CRT and the Micos II operating system. The system takes advantage of a recently introduced application software product called Application Programming Tools (APT), the company said.

APT offers the facility of faster program development through the use of program generators for input screens, files and reports. The programming language used

Turnkey Choice Needs Users' Involvement

(Continued from Page 31)

tem, even if it doesn't live up to your expectations.

Sometimes, the programming you've requested and had delivered may be extremely costly and absolutely useless if you change over. And sometimes the whole matter ends up in litigation.

The user might be helped by comparing the purchase or lease of a minicomputer to the purchase of life insurance. You would not purchase life insurance on the basis of price alone, without assessing what you really need to protect yourself for the future.

With this in mind, be skeptical of companies offering the moon for 50% less than everyone else and double-your-money-back guarantees. The business may not survive to get double its money back.

In summation, the user must:

- Know what he wants to accomplish.
- Take the time to have a feasibility study done or have the system designed correctly, the first time.
- Test the system before it is installed.
- Run his existing parallel system before stepping into the deep unknown.
- Install a system slowly, making certain that it meets or exceeds established benchmarks and criteria.
- Visit other existing user installations and obtain a candid critique of their experiences with the system.

The hardware should be:

• Capable of performing present tasks and future, realistic tasks for five to seven years.

- Manufactured by a reputable hardware manufacturer.
- Cost-justifiable.
- Complete without hidden, open-end software programming charges.
- Proven effective as quickly as possible.
- Delivered, installed and operational within a few weeks.

The vendor's responsibility is to:

- Know what his system can't do.
- Not oversell or undersell hardware.
- Understand the software job the user wants and either be prepared to do it at a fair price or tell the user to get someone who can do it — before he accepts the order.

- Avoid agreeing to unrealistic deadlines.
- Respect the customer.
- Treat the customer's business as if it were his own.

Deschamps is president of Turnkey Sales & Leasing, Inc., New York, N.Y.

with APT is called Extensive Basic, an MCS spokesman added.

The Micos II system can be used in stand-alone mode or in distributed processing applications.

The basic system costs \$28,750 from the firm at 525 Executive Blvd., Elmsford, N.Y. 10523.

Sykes Floppy Fits IBM 5100

ROCHESTER, N.Y. — The Comm-Stor/5100 is a floppy disk system designed for use with the IBM 5100 portable unit, according to its vendor, Sykes Datatronics, Inc.

The system is said to fill several needs unanswered by the IBM 5100: it produces floppy disk media readable by larger IBM systems and provides a random-access capability, a spokesman said.

The microprocessor-based unit plugs directly into the IBM 5100's serial I/O port without changes to the 5100 hardware or software, Sykes claimed.

The Comm-Stor comes supplied with a tape cartridge containing 10 Basic key files and 14 APL functions.

A single drive costs about \$3,000 and a dual drive is priced at \$4,000 from Sykes at 375 Orchard St., Rochester, N.Y. 14606.

Aris Turnkey Performs Publishing Applications

PLAINVIEW, N.Y. — Aris Associates is offering a minicomputer-based system for publishers with 2,000 to 4,000 titles in inventory.

The system can handle 300 to 600 orders per day, order picking, invoicing and accounts receivable, according to the vendor.

In addition, subscription fulfillment for

up to 10,000 subscribers per issue can be processed on an on-line basis for monthly and quarterly issues in combination with book orders, according to a spokesman.

Other applications that can be handled on the system include purchase order control, inventory replenishment, accounts payable and general ledger.

A typical system includes 64K of memory, two 10 million-character disk files, a 600 line/min printer and two CRTs and costs \$85,000 including software.

A basic system with a low-speed printer and one CRT costs \$39,000. The firm is located at 20 Central Park Road, Plainview, N.Y. 11803.

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Agents Match Clients, Houses With Help From Mini

Special to Computerworld

MELVILLE, N.Y. — A mini-computer has proven to be the key to opening doors for real estate agents here.

The system, located at Multiple Listing Service of Long Island, Inc. (MLS), has been credited with making the job of finding the right house for the right client more efficient.

MLS is an amalgamation of 659 participating offices in the resale home market in Queens, Nassau and Suffolk counties.

Of all the minicomputer's functions, the one that seems to trigger the most sales is a residential analysis done on the portable terminals the agents use. One broker reported the analysis has brought him a minimum of one home sale a month — at an average price of \$60,000 — since the system was installed in April.

The analysis is often the clincher for the prospect who isn't sure he can afford the home, according to Val Mason of Butterfield Realty. The prospect is asked to provide the amount of his monthly rent and his estimated income. Once this data has been entered, the terminal prints out the price he can afford without spending more than he does now.

The terminal also prints the income tax benefits which will accrue based on his real estate tax rate and what his equity will be over the next five or 10 years based on amortization and a 5% increment for use "appreciation."

For example, a father of one earning \$20,000 a year and paying

\$375 a month for rent finds that the same payment will bring him (after a downpayment of \$9,000) a \$45,000 house in which, based on the formula, he will have a \$23,055.90 equity in five years and a \$41,402 equity in 10 years.

According to realtors, the terminal's printout of these compilations is generally seized upon by the prospect for further study at home.

Listing Update

The bread-and-butter function of the system, and one which relates directly to MLS's prime function, is the listing update.

With the system, all listings received from the association are entered into the mini and are immediately available to the terminal subscribers. Members not on the system receive their information by messenger up to 24 hours later.

Because of the competitive edge it gives them, many of the subscribers request the listing updates three times a day.

Subscribing agents can also enter their prospects' requirements — such as number of rooms, baths and preferred neighborhood — by code so that another agent can search through them. If he has anything which satisfies the requirements, he can then contact the prospect's agent and suggest that a particular home listing with the calling agent be shown.

On the selling side, through its ability to list "comparables," what similar houses have sold for and are currently selling for, the

system helps agents keep their clients attuned to reality.

When a homeowner comes in to list a house, he often has an inflated idea of what it will bring. The system can print out a list of comparable homes which are on the market now and against which his home is, in effect, competing.

Since it was introduced in April, the system has grown consistently. So far, approximately 18% of MLS's membership has signed up.

According to Margot Wolf, "that is about the number of agents and clerical employees which can be trained at MLS headquarters in Melville, Long Island."

The only charge for the system is \$158 per month for the terminal.

One Complaint

The only complaint about the system is that when the new listings come in — seconds after they have been entered — they lack the photograph that is a standard part of the manually distributed hard copy.

However, as one broker pointed out, "We are beginning to find out that the lack of the photo is an advantage. If we get a match between a listing and what the prospect has asked for we can tell him we've got just what he asked for."

"Sometimes with the photograph we tell the prospect that and he says 'Yes. That's what I asked for, but I don't like it.'"

The system is a Hewlett-Packard 21MX, programmed by Realtronics, Inc. of McLean, Va.



Realtor Art Kaufman uses a portable terminal hooked up to a mini to find an appropriate home for his prospects.

Better Software for Minis Seen Future User Demand

By John P. Hebert
Of the CW Staff

WOBURN, Mass. — What is the most important trend in the area of minicomputers?

This question was asked of the four workshop session leaders at a meeting here recently and drew responses ranging from the need for better software to stiffer competition for vendors of only minicomputers.

Minicomputer vendors will have to provide better software and maintenance in the future to help the end user do his job in the easiest manner and bring up applications quickly, according to John Kogan, a consultant with Arthur Andersen & Co.

Eric Frey, president of Frey Associates, said he saw minicomputers doing exactly the same thing large machines were doing 10 years ago. As a result, Frey said, the future trend for

minicomputers will be to grow the way mainframes have for the past 10 years.

Len Farano, executive vice-president of Gambit Management Strategies, Inc., saw two trends. One was a greater awareness on the part of users in making business decisions.

Shake-Out Predicted

Second, the arrival of mainframes in the minicomputer marketplace will bring about a "shake-out," Farano said. Users will get a better product from the resulting competition, he added.

The fourth speaker, Art Gravina, president of Cybek Corp., noted that although minicomputer hardware is far advanced, software for the machines is back in the 1960 to 1965 era. And "hardware without software is useless," Gravina said.

Megatek Turnkey Includes DG Nova

SAN DIEGO, Calif. — Megatek Corp.'s 5000 series is a turnkey graphics system based on Data General Corp. Nova equipment.

The system, which includes a graphics display and Nova minicomputer, has 12-bit screen resolution, a 21-in. monitor, hardware blink and translation, dashed lines and sharp constant intensity vectors, the firm said.

The Nova 3 is expandable to 128K words, comes with an upper- and lower-case keyboard with 20 function keys and features

a desk that is used as an operator's work station.

The heart of the system is a microprocessor-based graphic display unit. Called the MG552, it occupies two slots in the Nova and provides graphic conversions, control and display functions.

A basic system with 8K words of semiconductor memory, graphics processor, keyboard, 21-in. electronic monitor, graphics software and desk costs \$20,500, a spokesman said from 1055 Shafter St., San Diego, Calif. 92106.

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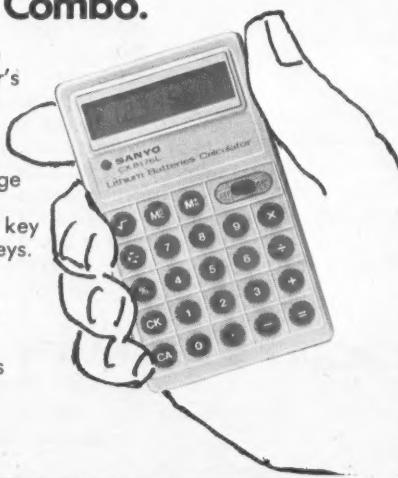
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COMPUTER INDUSTRY

CI Notes

Itel, Hitachi Cooperate On Large-Scale Systems

SAN FRANCISCO — Itel Corp. and Hitachi Ltd. have announced a joint development of large-scale computer systems.

"The companies have been working together for several years to combine the advanced computer technology and manufacturing skills of Hitachi with the extensive marketing, development and field service capabilities of Itel's Data Products Groups," according to John H. Clark, Itel's DPG executive vice-president.

Under the terms of the agreement, Itel will market and maintain the systems in the U.S., Canada, Western Europe, South America and Australia.

It is expected that the new computer systems, an extension of Itel's Advanced System family of computers, will play a vital role in the long-range strategy of penetrating the worldwide computer base.

STC, Memorex End Talks

LOUISVILLE, Colo. — Storage Technology Corp. (STC) and Memorex Corp. have terminated preliminary talks relating to a possible merger [CW, July 4].

Under terms of the Memorex offer, STC would have been merged into Memorex on the basis of .725 shares of Memorex common stock for each share of STC common.

"After giving careful consideration to all the terms and conditions, the Board of Directors of Storage Technology concluded that proceeding further with the merger discussions would not be in the best interests of [the company] and its shareholders," according to Jesse I. Aweida, STC chairman and chief executive officer.

Microdata Proposes Upgrade

IRVINE, Calif. — Microdata Corp. has announced its intention to supply a software-compatible upgrade path from its Reality small business system.

No prices or configurations were announced for the small business system — dubbed Reality Royale — which is expected to have four family members and accommodate up to 128K bytes of memory and 600M bytes of disk.

The system is said to have some of the operating system in programmable read-only memory to increase throughput.

All members of the family from smallest to largest, should be compatible.

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. — The Department of Defense (DOD) has prepared a draft updating its policies and guidelines for the acquisition of automatic data processing (ADP) equipment. A final directive is expected to be released in September, a spokesman said.

The draft stressed competitive bidding and increased reliance on the private sector for software and services.

Draft 7905.2, entitled "Acquisition of Automatic Data Processing Equipment, Software and Services," emphasized reliance on a vendor's standard executive software wherever possible.

DOD components should not modify such software themselves solely to improve ADP equipment processing time performance, but should contract with a commercial vendor to develop and maintain DOD-required modifications whenever a significant economic benefit over the life cycle of the system can be documented, according to the draft.

Only in three circumstances can DOD components perform in-house modifications of vendor standard executive software, the instruction said.

The first two exceptions are when mission requirements preclude waiting to have an obvious flaw or error corrected and when the vendor does not agree to develop and maintain a modification which is dictated solely by the need to safeguard DOD information.

The third exception is when the senior ADP policy official determines that modifications, under conditions not specified above, can be accomplished more effectively and efficiently in-house.

Focus on Standardization

The draft also focuses on standardization, and indicates Federal Information Processing Standards (Fips), other than those dealing with standard data elements and representations, shall be specified for mandatory use in procurement documents of software, services and equipment unless a waiver is obtained from the Office of the Assistant Secretary of Defense (Comptroller).

"All contracts for data systems development, maintenance or operations services shall specify the use of DOD standard data elements and codes to the extent they are available and applicable," the draft stated.

Methods of procuring ADP equipment, software and services were ranked in order

of preference: functional systems requirements; equipment performance requirements; and a combination of these two, by specified make and model or by sole source.

Some portions of the draft will undergo changes following the recent receipt of comments from various agencies, a spokesman said. Among these are the point at which a single selection office will handle selection of equipment or services to be procured and the threshold level at which a delegation of procurement authority is needed, he added.

The original draft said each military department should establish and maintain a single selection office to develop solicitation documents and evaluate and recommend vendors' proposals.

This single office will handle selection when the value of the equipment or services to be procured is equal to or greater than

\$250,000, or if a dispersed system is to be centrally designed, programmed and maintained, the draft stated.

Where multiple vendors are involved, the DOD components "shall consider limiting the number of vendors to a practicable maximum of three" per system or installation, according to the draft.

Contracts should identify appropriate tests to validate the system's capability to meet performance requirements.

Value engineering incentive clauses should be used in solicitation documents and contracts in efforts to reduce costs and minimize technological obsolescence, the report indicated.

"Sharing of ADP resources and reutilization of ADP equipment shall be considered as the leading means for satisfying ADP resource requirements," it said.

IBM Trial Testimony Reveals CDC's Expectations, Plans

By Edith Holmes
Of the CW Staff

NEW YORK — Control Data Corp.'s peripheral systems probably won't do as well as the company forecasted they would during 1977, but the OEM business will do better than expected, according to Gordon Brown, CDC vice-president of marketing and planning.

Appearing as a witness here recently on behalf of the U.S. government in the trial of its antitrust suit against IBM, Brown discussed the anticipated percentage growths of various aspects of CDC's peripherals enterprises between now and 1980. He relied primarily on a document which CDC understandably wanted kept confidential — the latest draft of its current long-range plan.

Under that plan, CDC expects to grow in all areas of its peripherals business, Brown stated. Beginning with the OEM area, the CDC vice-president indicated his firm anticipates revenues to increase at a rate of 15% a year.

At one time, CDC had predicted OEM revenues would grow at a rate of 18% between now and 1980; however, this rate was considered too aggressive for "sound long-range planning," Brown said. He had personally recommended a 12% growth rate in the OEM area.

The OEM business is more sensitive to slowdowns in the economy as a whole, Brown told the court. CDC's expectation of two more recessions over the next five years accounts for its conservative revenue growth expectations for this area.

On the other hand, in times of economic recession or depression, users are more likely to invest in peripheral equipment in hopes of improving the overall performance of their computer systems, he said.

This is part of the reasoning behind CDC's expectation that its peripherals business, which includes IBM plug-compatible peripherals, will increase 22% each year in revenues for the next few years.

The corporation's business products area is expected to grow 10% in revenues annually through 1980, according to the draft plan.

Producing forms, a full range of disk products and computer room supplies, the business products business is a "cash cow," a business that generally has a positive cash flow, Brown stated.

Finally, the CDC executive noted that the data systems area of the peripherals business is projected to increase between 9% and 10% per year in revenues.

Much of the OEM business is free of the risks associated with the IBM plug-

(Continued on Page 39)

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Pansophic Marks Its Eighth Year With Record Sales

OAK BROOK, Ill. — On April 29, Joseph A. Piscopo cut the first slice of a giant birthday cake — a confection celebrating the eighth anniversary of Pansophic Systems, Inc.

Piscopo, president of the firm, founded it in 1969. Before the first year was over, its first software product had been written and by 1970 it was being vigorously marketed. That product, called Panvalet, has become a standard in program management, security and control, he said.

When Pansophic was formed — just prior to IBM's now-famous decision to "unbundle" and separately price its computer software and services from its computer hardware — it was initially engaged in consulting services, systems design and programming for firms in the Midwest. It had three computer software specialists and a small office just west of Chicago.

A great number of new firms appeared starting in 1969, since IBM's decision to unbundle provided the opportunity and the impetus for the emergence of a new subindustry of independent software suppliers.

The capital requirements were minimal. There was a vast opportunity available for the development of generalized computer software products which could be readily marketed to over 20,000 IBM computer users around the world.

The software industry has been volatile in the last eight years. Of the more than 700 software companies formed in 1969, only a handful are in business today, and only two are profitable, Piscopo said, noting Pansophic is one of the more profitable ones.

Sales Figures

"Pansophic reported a record \$7.2 million in sales for the fiscal year ending April 30, 1977. This represents nearly a 45% increase over the previous fiscal period ending April 30, 1976," Piscopo said.

"Earnings for 1977 were 690% greater than for 1976. The major source of this increase was international sales, which increased approximately 80% over last year's figures.

"For the sixth year in a row, Pansophic paid \$50,000 in dividends to shareholders," he added.

"We look for some reduction in overall processing costs resulting from hardware technology advance, coupled with a continued strong increase in user acceptance of packaged software," Piscopo continued.

"The software industry is maturing to the point where an ongoing research and development effort will be sustained. We expect an explosion of innovative technologi-

cal developments to occur over the next four to 10 years, particularly in systems software," he said.

Piscopo feels users can expect more variety of product offerings, improved reliability and flexibility, high performance and operating efficiency.

"Independent suppliers," he said, "will provide even more effective training, better documentation, and more capable product services and local support personnel to serve their users and support their products. Extended

capabilities of improved features will be included in design consideration for future products."

Widely Used

Marketing of Panvalet in the U.S. began early in 1970 and expanded to worldwide markets in 1971. Today Panvalet is one of the most widely used software products ever developed.

In fact, at the recent International Computer Programs, Inc. (ICP) Million Dollar Awards in Chicago, Panvalet received awards for having sales over \$10

million and having over 3,000 customers.

Pansophic acquired exclusive marketing rights in May 1973 to another product, Easytrieve, an information retrieval and file management system. Easytrieve has also been highly successful and received ICP awards for having sales totaling over \$5 million and over 1,000 installations.

Pansophic has also developed Pan*Da, a disk analysis and data set management system providing large computer users with an effective tool for efficient management of magnetic disk storage devices. Total Pan*Da revenues to date exceed \$200,000, with 200 installations.

Throughout its history, Pansophic has dedicated itself to market only software products of the greatest benefit to users and with high standards of technical excellence and reliability, Piscopo said.

The company has made a total commitment to support the needs of users through a high-caliber customer service staff, he indicated.

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With Coming of National Health Insurance

DP's Share of Health Insurance Dollars Seen Growing

By Tori Wiseman
Of the CW Staff

MENLO PARK, Calif. — Health is the third largest industry in the U.S., with 1976 expenditures of \$140 billion and an additional \$43 billion in federal expenditures, or 11.4% of the entire federal budget.

The data processing share of administrative costs ranges between 15% and 30%, yielding a commercial market for Medicare,

Medicaid and Champus (a military payment system) of \$292 million. Another \$100 million is being spent in-house by the states and an additional \$20 million goes for other expenses, according to a recent report by Input, Inc., a market research firm here.

This \$412 million for fiscal 1976 does not include amounts spent by the federal government internally for DP, it added.

The report noted that the advent

of National Health Insurance (NHI) could raise the federal expenditure forecast for 1980 by as much as 131%.

The Medicare, Medicaid and Champus programs are generally managed by fiscal intermediaries, carriers and contractors, who subcontract DP activities to commercial vendors, Input said, citing California as an example. Maryland, it said, is an example of a contractor which does its own

DP. "The Blue Cross/Blue Shield plans are the largest contractors, and Electronic Data Systems (EDS) is the largest DP subcontractor, with approximately \$70 million in related revenues in 1976," the report stated.

The State of California, one of the largest beneficiaries of all three programs, contracts its \$2.4 billion Medi-Cal program to a consortium of Blue Cross and

Blue Shield plans in the state, the report said. The administrative portion of the contract is \$43 million, of which EDS receives \$13 million for DP and Blue Cross and Blue Shield retain \$1.5 million for DP.

"The advent of NHI will cause considerable tremors through the existing Medicare and Medicaid systems and will result in DP expenditures in 1980 ranging between \$667 million and \$1.2 billion, depending on which NHI program is implemented," Input noted.

The report said the magnitude of the DP requirements for NHI are so great they will influence the way the NHI program is administered.

Processing Estimates

"System processing estimates carried out by one processing vendor currently operating under Medicare and Medicaid shows that an ultimate NHI would dwarf the size of the current Social Security processing resources, which themselves are among the largest in the country.

"NHI will create more DP dollar expenditures, greater standardization of functions, increasingly centralized control of decision-making and, because of the magnitude of even the smallest NHI proposal, will create a great demand for vendors with related capabilities and experience," Input stated.

Contracts will go to those vendors who are experienced in health insurance-related work, with an emphasis on turnkey experience, i.e., "the ability to provide the software and services related both to DP and to the allied administrative paperwork," the firm noted.

"Barriers to market entry, which can often be erected through proprietary software, will be less of a factor in the NHI environment for the first couple of years. This is because of the uncertainty, at this time, of the exact characteristics of the final legislation.

"HEW is most likely to take a model system approach with NHI. This method requires vendors who wish to obtain processing contracts to use software that conforms closely to the federal standards," Input said.

"One way for vendors to gain an early entry into the NHI world would be to participate in development of that model software," the report suggested.

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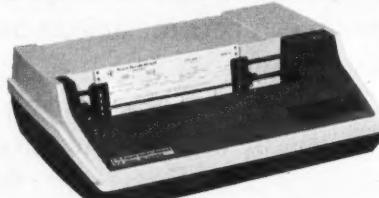
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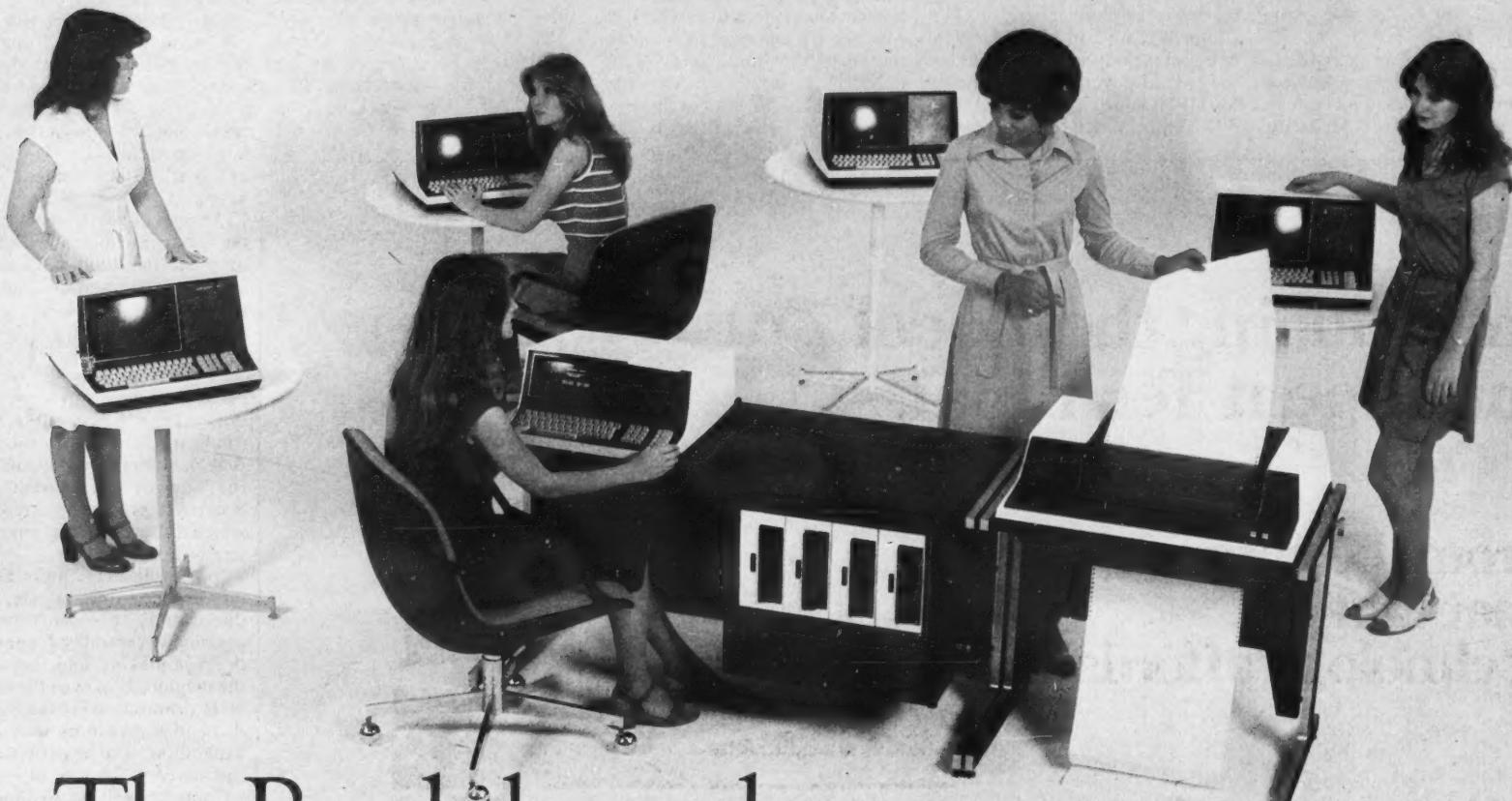
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CDC Continuing R&D on Mass Storage System

By Edith Holmes
Of the CW Staff

NEW YORK — Between \$15 million and \$20 million has already been spent by Control Data Corp. on its CDC 38500 mass storage system, and the research and development expenditures are continuing, according to Gordon Brown, CDC's vice-president for marketing and planning.

CDC expects mass storage systems to become commonplace and so plans to put the 38500 out through a series of product offerings over the next several years, Brown said here recently during his testimony as a U.S. government witness in the trial of the anti-trust case against IBM.

The CDC executive described his corporation's plans in this area broadly — as a "hierarchy of products" with interrelationships and interdependence.

CDC expects its mass storage systems to satisfy three kinds of users: those with IBM systems, those with CDC systems and those who occupy the OEM marketplace.

The \$15 million to \$20 million to which Brown referred has been expended only to develop products related to the total 38500 configuration.

Brown estimated that the basic technology work done by CDC in the mass storage area cost between \$3 million and \$4 million. Research and development on Vdam — the software required by the system and consisting of staging packages designed to be used with a variety of main-

frames — has eaten up approximately \$6 million.

Some \$7 million has gone into the creation of the 38500 hardware — the selector, cartridges and mass storage adapter, Brown said.

Another \$2 million has been spent on enhancements to the CDC system, which currently has two users, and on follow-on versions of the mass storage device, he stated.

Much of the R&D cost for the system has been allocated to a CDC subsidiary, Computer Peripherals, Inc., which was formed in April 1972. As of October 1975, when his deposition in U.S. vs. IBM was taken, Brown said about \$8 million of these costs had been deducted directly from CDC's accounts.

Unlike the creation of its disk products, CDC began development of the 38500 three years before IBM announced its product in this area in October 1974.

During the basic R&D period for the 38500 — between the middle of 1972 and late 1974 — CDC spent approximately \$10 million on the system. In 1975, another \$4 million was spent, and a similar amount was expended in 1976 on this project, Brown said.

CDC had its first 38500 user by September 1976, but the product has caught on slowly.

"Our expectations were that the IBM systems user would accept the mass storage

concept earlier than he did," Brown said.

In addition, CDC expected to sell more mass storage devices in 1976 than it did, thus falling short of sales quotas for the 38500 last year.

Other peripherals sales made up for this short fall, causing CDC's overall market objective in the area for 1976 to be exceeded by 10%, he stated.

CDC's mass storage system incorporates technology significantly different from that employed by IBM's 3850 mass storage product, Brown indicated. There was some feeling in CDC that if IBM engineered its storage device one way, CDC should too — given the resources IBM can bring to bear on such projects.

Brown said he continues to believe, however, that the CDC line head recording technique is superior to anything IBM has developed in the mass storage area.

Survey Directory

FAIRFIELD, N.J. — Over 1,500 mult-client reports and syndicated services available from consulting firms are listed in the second edition of the *Directory of U.S. and Canadian Marketing Surveys and Services*.

The directory includes 125 consulting firms and both industrial and consumer marketing research companies as well as media research firms. The companies range in size from such international firms as IBM, A.D. Little, A.C. Nielsen and Stanford Research Institute to a number of one-man operations.

The directory lists about 50 surveys, including general market studies on computers and DP and such special reviews as computers in insurance, medicine and process industries; and minicomputers.

The directory is priced at \$100 from C.H. Kline & Co., 330 Passaic Ave., Fairfield, N.J. 07006.

Testimony Reveals CDC's Plans

(Continued from Page 35)

compatible peripherals business, Brown said.

In the plug-compatible area, however, he said CDC's general plan is to "capitalize on any substitute business opportunities available."

Smaller Revenue Base

Greater growth can also be projected for peripheral systems because they comprise a smaller revenue base — \$75 million compared with CDC's OEM revenue base in excess of \$150 million, Brown added.

Continuing his explanation of the principle that it's easier to achieve more dramatic gains in small revenue base areas, Brown cited the small dollar values presently generated by the IPL Omega 480-1 and Omega 480-2 systems and by CDC's 38500 mass storage system. With virtually no dollars associated with either of these programs, CDC can expect a compound growth rate of approximately 30%.

In other words, he explained, you don't

have to sell many peripherals systems which include the Omega and mass storage devices to reach a 20% growth rate of the \$75 million revenue base; you just have to sell 36 or 40 of these systems each year, he suggested.

IBM does impact CDC's short- and long-term planning, Brown told the court. It is critical to CDC to evaluate where its products stand in relation to those of IBM, he stated.

The CDC vice-president identified three kinds of risks: marketing risks, or "Can we sell the product we produce?"; technology risks, or "our own ability to complete all phases of research, development, manufacturing and start up costs"; and business risks.

Business risks are perhaps "the most critical" to the plug-compatible business, he said. These risks can include unforeseen product announcements, price cuts and the potential for subsystems to be rendered inoperable and/or incompatible by IBM actions in microcode encryption techniques.

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Medicine Seen Healthy Market for Peripherals

LOS ANGELES — As far as the computer industry is concerned, the prognosis for the medical equipment market is excellent, in one executive's opinion.

"The marriage of computer technology and medical science has really revolutionized health care in the United States," according to Ralph Gabai, division vice-president and general manager of the Pertec Division of Pertec Computer Corp.

Computerized office systems that allow doctors to have better access to their records, faster turnaround time on patient's bills and generally greater office efficiency is fast becoming commonplace, he noted.

"These are simply routine office functions," Gabai stated. "What is really exciting are the increasing number of applications that would have been impossible to achieve without a computer."

As an example, he cited Dr. Lewis C. Cook, an ophthalmologist from Texarkana, Texas, who is developing a software package that will include data on patients' al-

lergies to all medication related to eye surgery and eye diseases.

Using Tex-E-Comp's SBC, the basic system, called a 2050, includes a 16-bit CPU with up to one million bytes of directly accessible core; a 10M-byte Pertec D3000 disk drive, 5M bytes fixed and 5M bytes removable; a 120 char./line, 9x7 matrix impact printer with a capability of 60-150 line/min; and a 24-line, 80 char./line video display terminal.

Medical Office Tasks

In addition to this unique application the system handles all routine medical office tasks such as processing patient information, on-line posting of individual transactions and turnaround billing receipts, transaction history and daily proof reports. It also handles past due reports, invoicing, monthly billing statements and standard forms for Medicare, hospitals and the American Medical Association.

"Equally exciting in terms of unusual ap-

plications is the use of computers in connection with the rapidly growing medical diagnostic techniques called computerized tomography that reconstruct images of the inside of the body," Gabai stated.

Exotic applications aside, Gabai feels that the relationship between medicine and DP will be meaningful for all concerned — especially computer peripheral equipment manufacturers.

Hospital administrators realize that the help of the computer industry will be essential to cut health care costs, expedite communications, tighten up financial systems and generally improve admissions procedures.

"Anyway you look at it, whether it's routine office functions or more esoteric applications like CT scanning, computer peripheral equipment will continue to have a very healthy marketplace in medicine because of the increased use of CRTs and terminals by hospitals," Gabai concluded.

Executive Corner

- The Burroughs Corp. board of directors has elected James C. Fletcher and Arthur R. Seder Jr. to the board and has also elected James A. McCullough executive vice-president, business machines group and J. Paul Leebrick Jr. a Burroughs vice-president.

- Richard J. Egan has been elected to Cambridge Memories, Inc.'s board of directors.

- John C. Lobb has been elected to the board of directors of Modular Computer Systems, Inc. (Modcomp).

- Glenn E. Penisten was elected chairman of the board and president of American Microsystems, Inc.

- William L. Miron, past corporate executive vice-president, director and member of the Office of Chief Executive for Bendix Corp., has accepted a seat on the Process Computer Systems, Inc. (PCS) board of directors.

- Dr. Lawrence M. Parks has been elected president of Commercial On-Line Systems Corp.

- Zach Lonstein has been elected president and chief operating officer of Transportation Computing Sciences Corp.

- Joseph L. Dione has been named president of McGraw-Hill Information Systems Co., a division of McGraw-Hill, Inc.

- Robert D. Enochs has been named to head the new division for computer-output microfilm products as part of Bell & Howell Co.'s microimaging group.

- Gerard R. Gaudet has been named Dataproducts Inc.'s vice-president of operations for Sunnyvale, Calif. and Hong Kong.

- Sol Zasloff has been appointed vice-president of marketing for Micropolis Corp.

- H. Richard Seltzer was elected vice-president of ITT Domestic Transmission Systems, Inc., a subsidiary of International Telephone & Telegraph Corp.

- Joseph F. Bradley has been appointed vice-president, marketing, components division of Burndy Corp.

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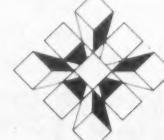
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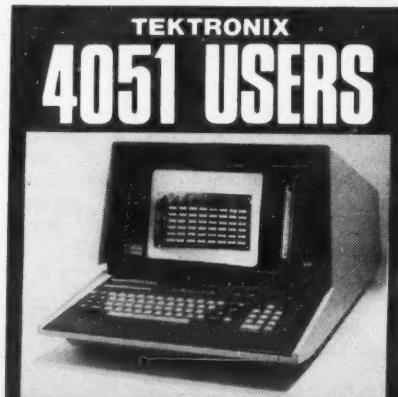
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Weston, one of the nation's top environmental consulting firms, offers an exceptional growth opportunity for an individual with 2-3 years technical programming experience. Prefer mini computer experience with Hewlett Packard equipment and plotting experience using CALCOMP or Tektronix. FORTRAN with some Assembler language desired. Candidate must have excellent skills and be willing to travel first 6 months of employment.

If you are currently employed and are ready to make a move which will further your career and broaden your experience, this is the perfect opportunity. Qualified applicants are requested to submit resume including salary requirements, to: J. Pavletich

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Weston Way, West Chester, Pa. 19380

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The position responsibilities are to lead a group of software engineers in the designing, coding, and testing of a State-Of-The-Art Mini-Computer Operating System. This person should have had experience leading or participating in a team which actually built an operating system. The candidate should be able to put together non-trivial systems in an elegant and simple manner (as opposed to non-maintainable complex systems), and should be a strong take charge professional who thrives on seeing reality destroy the aesthetics of theory.



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Please call COLLECT or forward resumes to
MULTI PROCESSING, INC.
Four Militia Drive
Lexington, MA 02173
Telephone 617-861-6300

Our staff will be available Monday & Thursday
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- Requires experience in data communications minicomputer programming at the assembler level.
- Experience with RJE-type communications and synchronous protocols preferred. Knowledge of SDLC fundamentals a plus.

**DIAGNOSTIC ENGINEER/
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- Requires an engineer or hardware-minded programmer with minicomputer programming experience and a flair for the challenge of diagnostic test software.

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- Experience with DEC PDP 11/35 or higher level computers required.
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- Requires experience in general purpose applications minicomputer programming of peripheral devices, at the assembler level.
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Requires on-line experience for systems development in Assembler Language, maintenance, program testing and the installation of CDC and PDP equipment.

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Requires extensive experience in the design and implementation of applications in an IBM OS/MVT or VS environment using MARK IV, COBOL, FORTRAN, TSO, IMS, IBM 3790 programming helpful.

SYSTEMS PROGRAMMERS

Requires experience in one or more of the following areas: Operating Systems (MVT/HASP, MVS/JES2). Hardware/software performance measurement. Data Base management systems (IMS/VS DB/DC) and telecommunications (VTAM, NCP, 3790).

OPERATIONS SERVICES

COMPUTER UTILIZATION ANALYST — Requires experience in analysis of SMF and other systems-produced utilization data; use of application program evaluation/optimizing tools; extensive background in 370 OS JCL/Utilities and TSO; plus experience with MVS, distributed processing, and COBOL or MARK IV programming. Operations background helpful.

TECHNICAL SUPPORT ANALYST — Requires experience in providing high level technical and procedural support to users in closed-shop environment; sound computer system production background and communication skills; and extensive experience with 370 OS JCL/Utilities MVS TSO and distributed processing.

DOCUMENTATION ANALYST — Requires experience in developing and writing technical standards and procedures to support computer system production environment; sound computer system production background and communication; and writing 370 OS JCL in MVS environment.

We offer excellent salaries, benefits and growth opportunities. Send resume including salary history in strict confidence to: J.R. Brune, Dept. 002, AMTRAK, 955 L'Enfant Plaza SW, Washington, DC 20024.

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PROGRAMMERS

The growth of our company has created several openings in our Pittsburgh headquarters office.

Applications Programmer

The individual we are seeking should have an associate degree or equivalent and a minimum of two to three years' experience in programming on IBM 360 or 370 computers with manufacturing and/or financial applications. Proficiency in COBOL language and 360 and 370 OS or DOS equipment is also necessary. RJE experience preferred.

Analyst/Programmers

The ideal candidate for this position must have demonstrated proficiency in manufacturing-related systems design, programming and implementation; such as factory cost accounting, M.R.P. inventory control, and scheduling. Must be skilled in COBOL and familiar with large scale computer terminals as well as programming languages using DOS/OS equipment. An applicable Bachelor's degree plus three years' experience in programming is required.

If you feel you are qualified for one of these positions, send your resume including salary history to:

CW 5115
797 Washington Street
Newton, Mass. 02160

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Compiler Development

Digital's Central Engineering organization is a dynamic, challenging environment. We're currently involved in major Compiler Development projects and are seeking additional professionals who can make significant contributions.

Supervisor

Working with extremely intelligent peers as part of our Commercials Software Systems group, our largest and fastest growing organization, you'll be responsible for the development of BASIC language processors for multiple machine architectures. You must have solid project leadership experience, compiler design and development experience, and a knowledge of BASIC, PL-1 and FORTRAN languages would be a definite asset. BS/CS in Computer Science or related disciplines preferred.

Senior Software Engineers

These positions require mini-computer programming experience preferably on a PDP-11 with BASIC Plus. You should also have a strong interest in compiler development and be motivated to succeed in a fast-paced environment. 2-5 years experience plus a BS/MS in Computer Science or equivalent is preferred.

Record and File Management Systems Programmers

We're seeking innovative programmers to design and implement record and file management systems, working with talented peers in an unstructured, positive atmosphere. A background in record and file design and assembly language programming is required, and a BS/MS in Computer Science or equivalent plus 2-5 years experience would be ideal. Experience with RSTS/E, RSX-11M or related mini-computer systems is a definite plus and a knowledge of BLISS programming is an asset.

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680 South 4th St.
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(502) 589-6657

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Office of Student Assistance seeks programmer/analyst to participate in extensive reorganization project and provide system-data research support.

Position requires a BA degree or its equivalent, 3-4 years programming experience in COBOL 360-370 OS environment. Knowledge of data base system will be a plus.

Salary in mid teens. Submit resume by July 24, to:
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225 West State St.
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Entry Level MINI/MICRO SOFTWARE ENGINEER \$16,000 - \$18,000

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Computer Park
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COMPUTER CENTER DIRECTOR

Assumption College, beginning September 1 or earlier. The director is responsible for providing software expertise, supervision and organization of all activities of the Center. The director must be able to assist in programming, be able to organize and supervise the personnel of the Center, as well as work with college personnel outside the Center in establishing information systems. Director must be willing to assist faculty and students in academic application. The center has a PDP-11 Computer, RSTS/E Operating System, 1 full-time employee and 6 part-time (students). Basic salary range 12,000 to 15,000, depending on qualifications and experience. Position allows, but does not require, teaching one course in Computer Science each semester.

Applicants are invited to send resumes to Mr. Mark Love, Business Manager, Assumption College, 500 Salisbury St., Worcester, Massachusetts 01609, by July 31, 1977.

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PROGRAMMER

A Boston based textbook publisher seeks an individual having two years experience with COBOL and OS JCL. A college degree is desirable but not a must.

This position is in a small EDP Department with high visibility.

We offer a competitive salary and benefits package. Send resume and salary requirements in confidence to:

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You will have a minimum of 5 years' experience in maintaining large-scale systems with in-depth training on compatible CPUs. You will have company support in assisting the Amdahl customer in his mixed-vendor environment to maintain full operations in his center. Openings in several major cities and at Amdahl headquarters in California. Please indicate 560-E on your response.

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Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, California 94086

Amdahl Corporation
680 Fifth Avenue
New York, New York 10019

Amdahl Corporation
2021 Spring Road
Oak Brook, Illinois 60521

Amdahl Corporation
22150 Greenfield Road
Oak Park, Michigan 48237

Amdahl Corporation
5454 Wisconsin Avenue, Suite 1535
Chevy Chase, Maryland 20015

amdahl

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We have an opening for an aggressive and responsible person with a financial background. Must be competent with COBOL. Experience with Burroughs medium systems is a plus. We offer excellent benefits and a salary commensurate with your experience. Send resume to Mr. Bruce Burton.

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Preferable: 5-10 years supervisory experience in a comprehensive computer installation, and a broad background in university academic and administrative computing or the industrial equivalents. \$24,000 to \$27,000 plus an attractive benefit package.

Submit complete resume, including salary history and references to:

Dr. DeForest L. Trautman
Director, Mgmt. Information Services
THE UNIVERSITY OF TOLEDO
2801 W. Bancroft St.
Toledo, Ohio 43606
Deadline: August 15, 1977
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(617) 423-6440

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S-H INTERNATIONAL
1616 E. Roosevelt Rd.
Wheaton, IL 60187
(Private Employment Agency)

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DATA PROCESSING RECRUITERS
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Expressions of interest should include comprehensive resumes and transcripts. Deadline for receipt of expressions of interest is August 15, 1977. No Phone Calls Please!

Expressions of interest should be forwarded to:

Personnel
CINCINNATI
TECHNICAL COLLEGE
3520 Central Parkway at
College Drive
Cincinnati, Ohio 45223
AN EO/AAE

SUPERVISOR SOFTWARE DEV

Large data processing dept. needs systems programmer with min 2 yrs supervisory exp to manage staff of 6. Will provide applications support on 370/OS/VSI. Must have working knowl. of OS internals. \$26,000 (fee paid). Contact P. Siegal

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1310 Liberty Bank Bldg
Buffalo, N.Y. 14202
(716) 842-0801

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James J. Rauker
Univ. of Minnesota, Duluth
251 Administration Bldg.
Duluth, MN 55812
(218) 726-8501
AAA/EOE

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- PROGRAMMER/ANALYSTS
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Suite 734, 20 N. Wacker Dr.

Chicago, Illinois 60606

(312) 782-7397—Frank Wolf

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PROGRAMMER/ANALYST
Newspaper Business Applications

Newspaper group has an immediate opening for an individual with knowledge of DEC PDP-11 with RSTS, RSX or IAS operating systems. Will be responsible for development, installation and maintenance of business systems in the BASIC PLUS and BASIC PLUS 2 programming languages at local newspaper sites.

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Primary duties will involve comprehensive instruction in all aspects of computer programming, evaluation of existing teaching procedures and programs plus the establishment of a placement program for post-release employment of residents.

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Mr. Glenn Weeks, Personnel Manager, Waupun State Prison, Waupun, WI 53963-(414) 324-5571. Applications or resumes must be received by July 29th, 1977. An Equal Opportunity Employer functioning under an Affirmative Action Plan.



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A senior marketing position to direct market penetration and product development of primary Harris Computer Systems Division product lines and related systems. Previous hardware sales experience and planning relative to marketing systems are required.

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Will develop and present software training courses. Two years' minimum programming experience and communications skills are necessary. Desirable applicants should have operating systems, language processors and data base background. Will be responsible for documentation and will teach course offerings. 25% travel required.

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A minimum of 2 years' experience required in hardware evaluation, design, coding, debugging, documentation and release of fault detection and isolation software. BSEE or computer sciences.

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Position involves maintenance of an innovative IBM 370 Teleprocessing system with microfiche terminals. At least three years in-depth experience maintaining both IBM DOS and OS Teleprocessing systems required, preferably CICS with 3270 terminals. Must be able to maintain system single handedly.

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Applications are invited for professional positions (all ranks) open for the Academic Year 1978-79, starting 1 September 1978, at the University of Petroleum and Minerals, Dhahran, Saudi Arabia, in Business and Industrial Administration (Undergraduate and MBA) including the following fields:

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Minimum regular contract for two years, renewable. Excellent salaries and allowances, free air-conditioned housing, free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. Local transportation allowance in cash each month. All earned income without Saudi taxes. Ten month duty each year with two months vacation paid and possibility of participation in University's ongoing Summer programs with adequate additional compensation.

Apply with complete resume on academic and professional background, list of references, a complete list of publications with clear indication of those papers published in refereed professional magazines/journals with research details, and with copies of degrees including personal data such as, family status (wife's maiden name, names of children, age and sex) home and office addresses, telephone numbers to:

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MGMT. ANALYST PROGRAMMER Consult with senior analyst or users to design systems, test and debug complex programs. Must know COBOL and JCL. Minimum of two years experience - degree preferred.	Health Management Systems Requires heavy experience in O/S COBOL, JCL and utilities. Will be involved in developing and implementing new approaches to Health Management Systems. Requires knowledge of Utilization Review Processing and/or PSRO's plus demonstrated ability to interface with clients in the Health, Medical or Insurance Industries. Statistical experience desired.	Manufacturing Information Control Systems Development and support of MICS* software. Work with clients installing new systems and supporting existing installations. Prefer a manufacturing systems background with experience in BOMP, Inventory Control and Distribution Systems.	MANUFACTURING INFORMATION CONTROL SYSTEMS Salaries are commensurate with experience and ability. OSI provides an excellent employee benefits program, and we invite you to accept our challenge. Please contact the Personnel Department, 2775 Northwestern Parkway, Santa Clara, California 95051. (408) 987-4444. Please, NO AGENCY REFERRALS.	COMPUTER PROGRAMMER Background should include Bachelor's Degree in Computer Science or closely related field plus 1 to 3 years Fortran and/or Assembler in real-time environment experience. Familiarity with Xerox Sigma 3 or DEC PDP-11 desirable. Computer to computer experience a plus. Position involves communications software development in Electrical Power System monitoring, control, energy production and energy accounting. Must be willing to relocate and/or travel extensively first 2-3 years. Eventual relocation in Central New York State. This career position is with Power Authority State of New York Production Control Center. Send resume in confidence to: Power Authority of the State of New York, P.O. Box 277, Niagara Falls, New York 14302, Attention: E.F. Bridler An Equal Opportunity Employer
CENTRAL PENNA. Growing 370/158-OS shop in Central Pa. seeks	Municipal Governments We offer services to Municipal Governments and have openings for professionals with accounting systems background, including financial and payroll. Background in municipal environment desirable. Some experience in mini computers would be helpful.	Optimum Systems Incorporated	Optimum Systems Incorporated	Computer Systems Software Specialist If you have experience with GCOS and GERTS, you may be ready for this promotion-created opportunity with GE. We are seeking an aggressive problem-solver with a broad technical background. Based at our manufacturing facility in Wilmington, N.C., the selected candidate will play an important role in this Honeywell 6610 site. Responsibilities will include installing changes to and maintaining the operating system as well as providing training to our computer operations group and consultation services for time sharing and other assigned subjects. Requirements include either a degree in Computer Science and 3 years of experience, or 10 years of experience and a solid record of accomplishments. Strong knowledge of GCOS, GERTS and GMAP programming are musts. Position offers excellent starting salary, comprehensive GE benefits and the exposure and visibility that's needed for rapid professional growth and advancement. Send resume, including salary history, to Mr. R.W. Scales, Jr., General Electric, P.O. Box 780, Wilmington, No. Carolina 28401. An equal opportunity employer, M/F.
COMPUTER PROFESSIONALS Let us know who you are, where you are and where you want to go. Our business is evaluating your career and determining your career pattern. Business application programmers, programmer/analysts are much sought after by our client companies (the largest state-of-the-art installations). Where do you fit in this booming marketplace? We'll tell you, that's our job! If you're the best at what you do, fill out and mail this coupon to us. Because we're the best at what we do! For immediate assistance call in Boston (617) 423-1900 or in Houston (713) 960-0350.	UNIVERSITY OF PETROLEUM AND MINERALS DHAHRAN, SAUDI ARABIA The Department of Systems Engineering, University of Petroleum and Minerals, Dhahran, Saudi Arabia, will have faculty positions open for the Academic Year 1978-79, starting 1 September 1978. Candidates with PhD degrees preferably with teaching experience are invited to submit their applications. English used for instruction. Minimum regular contract for two years, renewable. Excellent salaries and allowances, free air-conditioned housing, free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. Local transportation allowance in cash each month. All earned income without Saudi taxes. Ten month duty each year with two months vacation paid and possibility of participation in University's ongoing Summer programs with adequate additional compensation.	PROGRAMMER ANALYST Portland based company needs a sharp programmer with 2 years of Cobol and some BAL experience. Good user interface. Salary 14-17K with Bonus Plan.	GENERAL ELECTRIC	
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For more information on Wang Terminal Products, call or write: Paul Gill, Director, Wang Terminal Products Division, Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851, (617) 851-4111.

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Like to shoot dumps? Amdahl needs:

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You should have good MVS internals experience and the ability to debug, plus expertise in one of the following areas:

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- JES 3
- VSAM
- TSO/TCAM

Current openings are in Sunnyvale, California.

Like customer contact? Amdahl needs:

SYSTEMS ENGINEERS

At customer locations. You should have MVS diagnostic expertise and the ability to be a jack-of-all-trades.

Currently there are several openings throughout the United States.

Like to do both of above with travel? Amdahl needs:

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To work with Field Engineers at customer locations to solve more difficult bugs.

You should have very good diagnostic techniques preferably with some MVS experience.

Current openings are in Sunnyvale, California.

NO MVS EXPERTISE? Drop us a note anyway. We also have systems engineering openings that do not require MVS experience.

Please direct your response to Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086 and indicate 310-D on your resume or letter. We are, of course, an equal opportunity employer.

amdahl

position announcements

NEW ZEALAND DATA PROCESSING OPPORTUNITIES

If you desire an opportunity to experience a new and exciting life style in the South Pacific, an opportunity for rapid technical growth and responsibility, and the opportunity to contribute to the development of government computing services in New Zealand, we have the opportunity.

The New Zealand Government has computing installations nationwide with extensive telecommunications networks. A variety of large computer systems and minis are employed supporting applications including:

- Health Care
- Criminal Justice
- Inland Revenue
- Social Welfare
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Specific openings include:

- Senior Systems Analysts
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- Data Base Administrators
- Senior Software Programmers
- Hardware Consultants
- Quality Assurance/Standards Analysts

These positions require previous senior level data processing experience with large systems, data base and telecommunications. The salaries for these positions range from \$10,000 to \$12,000. Each salary is competitive with DP salary levels in New Zealand and is consistent with the standard of living.

Confidential interviews for the above positions are being held in the United States. Please send full resume to:

CW Box 5112
797 Washington St.
Newton, Mass. 02160

ANALYST PROGRAMMERS

Applied Financial Technology, Inc. is seeking additional Analyst Programmers with assembler experience for the New Systems group. Knowledge of financial/accounting applications using data base techniques in 370 DOS/VS environment a definite plus.

We are a subsidiary of Buckeye Federal serving the financial community through tele-processing as well as batch processing.

Salary commensurate with experience. Excellent employee benefits and company paid. Please send resume with salary history to:

aftek W. Moore
Personnel Department
36 East Gay St.
Columbus, Ohio 43215

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Our expanding Pittsburgh M.I.S. function requires an individual to furnish consultation to our worldwide manufacturing facilities in formulating information systems.

We require a degree plus a minimum of 5 years experience with D.P. in manufacturing. Must be experienced in manufacturing systems design, M.R.P. scheduling, and factory cost control techniques. Applicant must be skilled in Cobol, and remote processing techniques using larger scale computers. 80% travel.

If you are interested in this opportunity to join our expanding Fortune 500 company, please send resume including salary history to:

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If you are looking for an interesting challenge with a bright future—

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BENTLEY COLLEGE

The office of the Computer Center and Information Systems has the following immediate positions available:

PROGRAMMER ANALYSTS

We have two challenging openings for people with a minimum of 2 years experience in business oriented programming. Knowledge of COBOL is required. Experience with FORTRAN, BASIC and DECsystem-10 operating system is desirable. Primary responsibilities will include analysis, programming, documentation, and maintenance of academic and administrative information systems.

You will be involved in the programming and analysis of an online integrated student record system.

SYSTEMS & PROCEDURES

WRITER/ANALYST

We are seeking an experienced person to analyze, design and document the administrative systems and procedures of the college and to assist in the training of staff in these systems and procedures. A minimum of a BS degree is required.

COORDINATOR OF ACADEMIC COMPUTER USER SERVICES

We are seeking a person experienced in consulting with users to lead the Academic Computer User Services area. Responsibilities will include managing student assistants and tutors, developing and publishing documentation and a newsletter, conducting non-credit seminars, developing special purpose academic software and consulting with users. The ideal individual will have experience providing user services support in a business oriented environment and have a background in accounting and management. A minimum of a BS in a business related field is required. The college has a DECsystem-10/60 supporting 64 timesharing terminals. Qualified applicants should forward resumes with salary requirements to:

The Personnel Department
BENTLEY COLLEGE
Beaver & Forest Streets
Waltham, MA 02154
EO/AAE

PROGRAMMER/ANALYST

DataPhase Systems Inc., a rapidly-growing leader in interactive database applications, has several challenging positions on its software staff. Responsibilities include system development and implementation, field support, and interfacing with vendors and customers. Limited travel. Two years' active experience in programming, including experience with MUMPS or MITS, would be preferable, as well as familiarity with minicomputer systems. Good communication skills required.

We offer an excellent salary and benefits program, with exciting opportunities for personal and professional growth.

Please call or write in confidence to:
Mr. Lloyd F. Botway
Manager, Systems and Development
DataPhase Systems Inc.
4528 Belview
Kansas City, MO 64111
(816) 931-7927

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Here at the Southern Regional Operations Center of American Express' Card Division, we maintain the latest in equipment and pride ourselves on the level of talent and expertise. To help continue keeping all of these forces operating smoothly, we're looking for a qualified individual with knowledge of scheduling, operations, and production control techniques. You must have at least 5 years' experience in a large DP facility, with at least 2 of those years in a supervisory capacity. Knowledge of O/S JCL would be desirable.

In addition, you should possess good verbal, written and analytical skills.

We offer an excellent salary and benefits package, outstanding growth potential, and a congenial, professional working environment — all complemented by a most enviable climate! To apply, send your resume with salary history/requirement in confidence to: N.P. FISCHLER, Manager of Employment.



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Right now we're upgrading existing systems to our 370/148 under VS1/CMS. In the planning stages are data base and telecommunications. Our current and long range plans offer high potential for career growth in a state-of-the-art environment.

If you have a minimum of 2 years experience with strong COBOL and JCL background and feel challenged by our kind of constantly changing professional demands, send your resume of education, experience, and salary expectations to Professional Employment.



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Software Writer

Well-known manufacturer of quality products is seeking an individual to develop software documentation and operation manuals for computerized products.

The candidate for this position should have a B.S. in Computer Science and preferably 1 to 2 years field experience in computer development and software documentation. A good understanding of computer hardware and the ability to clarify software development data into easy to follow instructions for the consumer is a must.

Your responsibilities will include the development of support manuals, the writing of operation, application and diagnostic for the hardware and the writing of description and application of the associated software. The candidate must also be able to specify all art needed to support the written material.

We offer a good starting salary and complete benefit package. If you have the above qualifications and desire a challenging position in software writing, please send resume in confidence to:

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These are but a few of the elements of a newly created position at Hillenbrand Industries.

Hillenbrand is actively seeking a Senior Level Assistant MIS Director for the Corporate MIS Department. Newly installed IBM 370/145 equipment has provided a stimulating environment for new development activity corporate-wide.

Qualified candidates should have a minimum of 7 years in an operations capacity and 2-3 years as a Data Center Manager. Must have thorough understanding of TOTAL, on-line systems and distributed processing technology. Experience with multiple operating systems which includes DOS and OS a must. Experience in systems software programming preferred.

We offer competitive salaries and benefits, a stimulating growth environment and an attractive semi-rural setting in Southeastern Indiana.

Qualified candidates should send their resume and salary history in strict confidence to:

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**Applications
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Computer Consoles has immediate openings for Senior and Intermediate-level Applications Programmers with mini-computer experience.

You'll be an important member of a development team, analyzing functional application specifications and designing, coding, debugging and testing software in accordance with these requirements. Moreover, you will formulate subsystem implementation strategies and provide technical assistance.

Successful candidates will have a BS in Computer Science or equivalent degree. 1-3 years' experience in Assembly language programming on mini-computers is a must. Experience with data base systems preferred.

Paid interview and relocation expenses. Send resume and salary requirements to:

Mr. Raymond W. Anderson
Personnel Manager

Computer Consoles, Inc.
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OF

COMPUTER SERVICES

Regional educational administrative data processing cooperative is seeking qualified candidates for the executive officer's position of the cooperative. An advanced degree in computer science, educational administration, or related field plus experience in administration is desirable. Position will start September 1, 1977 or as soon as possible thereafter. Cooperative will be relocating in Mankato, Minnesota in January 1978. Applications should be received no later than July 22, 1977 and should include resume with three references. Salary is \$22,000+ per year dependent upon qualifications. For further information call (507) 289-6105. Send applications to:

John E. Odom
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LOUISIANA STATE UNIVERSITY'S SYSTEM NETWORK COMPUTER CENTER has an immediate opening for a Senior Systems Programmer. This person will help plan and install the IBM 3033 on order. Candidates must have a Bachelor's or higher degree plus at least three years experience with IBM (MVT and HASP or MVS). Preference will be given to those candidates with training in MVS internals or who have worked in an MVS maintenance capacity. Responsibilities will include generation and maintenance of supervisory software, development of internal support programs, and user education. Experience in a Teleprocessing (VTAM/IMS or TCAM/TSO) environment would be helpful. Please send confidential resume to:

Dr. John M. Tyler, Director
System Network Computer Center
Louisiana State University
Baton Rouge, LA 70803
LSU is an equal opportunity/affirmative action employer.

DIRECTOR
ADMINISTRATIVE
PROGRAMMING
SERVICES

Clemson University is seeking a director for administrative data processing. Responsibilities include systems analysis, programming, and implementation of university-wide management information system. Staff of approximately 25 programmers/analysts including clerical staff are developing on-line systems and using IDMS data base software. All systems operate on an IBM 370/165-II under MVS. Candidates must have a bachelor's degree in an area related to data processing and financial management systems, master's degree preferred, at least five years experience with supervisory responsibility and a working knowledge of teleprocessing and data base technology. Salary 20K to 25K depending on qualifications. Apply before July 29, 1977 to:

DAPS Search Committee, c/o Graduate School, E-106 Martin Hall, Clemson University, Clemson, S.C. 29631.

Clemson University is an affirmative action/equal opportunity employer.

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CALL CHUCK WILSON COLLECT ANY WEEKDAY
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If a call is not convenient, we invite you to forward, in confidence, a brief letter or resume outlining your qualifications and career interests to:

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7101 Wisconsin Ave., Bethesda, MD 20014
DAVIES ASSOCIATES, INC.
Representing An Equal Opportunity Employer M/F

DIRECTOR, SYSTEMS DEVELOPMENT

Oberlin College, a private liberal arts college with a FTE of 2700 students, located southwest of Cleveland, is seeking a Director, Systems Development. The Director will be responsible for the supervision of personnel whose mission is to conceptualize, develop, test, document and maintain administrative systems. This position reports to the Director of Computing. Present equipment is a HONEYWELL Sigma 9 operating under CP-V.

QUALIFICATIONS: Demonstrated management and technical competence in the area of on-line administrative data base systems for a college or university environment using a large scale computer.

REQUIREMENTS: A master's degree, a minimum of six years experience in systems analysis and programming with at least two years in a supervisory position, and at least two years experience working with college or university administrative information systems. Significant experience beyond the minimum requirements may be substituted for the graduate degree.

SALARY: \$15,100-\$22,650 plus liberal employee benefits. Starting salary dependent upon experience and qualifications. Interested persons should submit resume by August 24, 1977 to: Marc M. Solomon, Oberlin College, Computing Center, Oberlin, Ohio, 44074. This position is to be filled by October 14, 1977 with the person reporting to work no later than November 14, 1977. **Affirmative Action (M/F)** Equal Opportunity Employer.

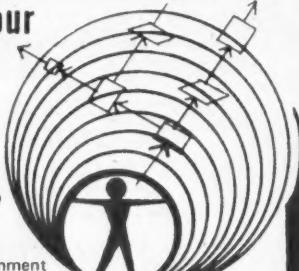
**DIRECTOR
OF
COMPUTER CENTER**

Ferris State College, enrollment 9900 students, is seeking a Director of the Computer Center. The College has an IBM 370/145, operating under DOS/VS, in a data base/data communications environment. The primary responsibilities of the Director are to administer the use of the computer facility; and to provide leadership and direction in the identification, development and implementation of new systems within the College. The Computer Center is committed heavily to supplying support services both to administration and instruction.

Candidates should have demonstrated significant technical competence and management ability. Experience in academic institutions is desirable. Skill in communication, both oral and written, is essential. Salary is competitive and dependent upon educational background and experience.

Applications should be received not later than July 30, 1977. Please send letter, resume, and names of three references to: Michael W. Gattie, Assistant Vice President for Budgets and Planning, Ferris State College, Big Rapids, Michigan 49307 (616) 796-9971. Affirmative Action/Equal Opportunity Employer.

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DEPUTY EXECUTIVE DIRECTOR

The J. Preston Lewis Regional Computer Center (JPLRCC) provides computing services for a number of users in Northwest Ohio, including Bowling Green State University, the City of Toledo, the University of Toledo, and the Toledo/Lucas County Criminal Justice Regional Planning Unit. Batch, time-sharing and real-time services are offered on an IBM 360/75 and a Univac 1110 2x1. JPLRCC is located south of Toledo in suburban Perrysburg, in an area with a full range of cultural and recreational opportunities. This is the number two position on the staff, with line responsibility for the Business, Facilities, and Production Managers. In addition, it has total responsibility for JPLRCC in the absence of the Executive Director. The successful applicant will have a Master's degree in a computer-related field or an equivalent combination of education and experience; at least seven years of experience in computing of which two must be in a networking environment; supervisory experience; and familiarity with all aspects of computer centers with emphasis on budgets, physical facilities, and operations. The starting salary will be in the \$22,000-\$27,000 range, depending on qualifications. In addition to salary, a full fringe-benefit package applies, including 4 weeks of vacation and tuition-free education for staff and dependents. Applicants should submit a complete resume, salary history, and list of references no later than August 15, 1977 to: Personnel Officer, JPLRCC 25875 Dixie Hwy., Perrysburg, Ohio 43551. (JPLRCC is an EO/AA Employer)

PROGRAMMER/ANALYST

Drew Chemical Corporation, a leader in the field of water and waste treatment chemicals has 2 outstanding openings for individuals with the following experience:

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Recruiting Manager

Drew Chemical Corporation

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COMPUTER SOFTWARE SPECIALISTS

Aquidneck Data Corporation, an innovative new software consulting firm located in Middletown, Rhode Island, is hiring computer software specialists to fulfill commitments in Navy on-line systems for shipboard applications. Openings exist in the areas of systems design, programming, documentation, and management.

• THE COMPANY

The company is founded on a philosophy of employee ownership and control; bonuses for excellent achievement; profit sharing; Management by Objectives; and an open, professional atmosphere.

• THE AREA

Middletown, Rhode Island, located near historic Newport and the Atlantic Ocean, offers a variety of year-round cultural and recreational activities. A peaceful rural community, Middletown is convenient to both the Providence and Boston metropolitan areas.

• THE WORK

Aquidneck Data Corporation maintains a close customer relationship by identifying with and solving specific customer needs. For this reason, ability to communicate effectively and to work within a team are valuable assets. Opportunities for professional growth are available in the following areas:

SYSTEMS ANALYSIS

Systems Analysts are needed for software development projects. Experience is desired in AN/UYK-7 programming, particularly in on-line combat systems applications. Experience with CMS-2 and the AN/UYK-20 is helpful.

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Senior level positions, requiring TRIDENT CCS knowledge and experience in combat system testing, exist for support of TRIDENT CCS integration/certification testing.

ADVANCED SYSTEMS ANALYSIS

Openings are for complex on-line computer systems design, requiring in-depth knowledge of software design and development, and extensive experience in assembly language programming. Experience with on-line combat systems is a plus.

TECHNICAL WRITERS

Available positions require technical writing experience in computer software documentation, assembly language programming, knowledge of Navy combat systems, or systems analysis.

SOFTWARE CONFIGURATION MANAGEMENT

Individuals with experience in software configuration management and control of large scale software products are sought for consulting on TRIDENT CCS configuration management efforts. Recent experience with Navy combat systems and project management is desired.

To apply, send a copy of your resume to:

Ms. Janet Cooper

Aquidneck Data Corp.

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Exclusive client seeks bank D.P. executive, staff of 150, multi 370's. Salary range \$45-50,000.

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Over 15 major Houston corporations now have IMS! Industries include (Oil & Gas, Manufacturing, Banking, Insurance, Chemical). Your IMS DB/DC skills are urgently needed to keep pace with current expansion. Language background required is COBOL, ALC or PL1. Hardware IBM 370/OS. DL1 experience is a must. Salary range \$17-22,000.

IMS DATA BASE DESIGN AND CONSULTANT

Will design and evaluate the IBM IMS DATA BASE facilities for a major co. Will recommend programming and testing methodologies for data base design and administration. Will prescribe the data base standards and procedures for data center consisting of IBM 370/168 base CPU's MVS. Salary range \$22-30,000.

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A major company is seeking a person who will design and support a nationwide in-house TP network. Must be familiar with IBM front-end 3705 NCP w/ VTAM environment. Salary range \$24-30,000.

SYSTEMS SOFTWARE ANALYST

Duties will be to modify, develop, and fine tune the control software which supports a nationwide distributive processing system, using IBM 3705 Intelligent front-end, and 370/168 MP, MVS, CPU's. Salary range \$25-35,000.

SYSTEMS PROGRAMMER

Seek the VS pro with heavy TP experience, VTAM, SDLC, IMS, etc. Salary range \$24-28,000. Contact Mike Wilcox, VP Data Processing:

ADDINGTON & ASSOCIATES

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(713) 780-8810

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To apply, send your resume to Manager of Employment, Dept. 728

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(301) 654-9225

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- (2) Minicomputer and Telecommunications specialists with strong technical skills.
- (3) Degree desired. Experience in lieu of degree acceptable.
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UTC Amplifier S/N 67833
Lyon's Densitometer Cardiac output Computer S/N 2147
Withdrawal Strings Pump S/N 64988
Additional Cuvette AO Oxymeter S/N 300

Each bid shall be made upon the basis that each, every and all of the items hereinabove described is bid for on the basis of an "as is" transaction. Bidders are instructed to inspect the personal property and each of the items hereinabove set forth during regular business hours and so as not to interfere with the services, treatment and/or operations of the Hospital of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT at the premises of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT located at 550 School Street, city of Pittsburg, County of Contra Costa, State of California 94565.

Each bid shall be for the complete computer system or as to specific items of said personal property, preference and priority being given to bids which shall be for the complete unit rather than for component parts.

Every bid shall be submitted only on the standard bid form available at the office of the Administrator of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT, 550 School Street, Pittsburgh, CA 94565. Bids will be received by the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT until 5:00 o'clock p.m. on the 27 day of JULY 1977, at the office of the Administrator of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT.

Bids will be opened and publicly read aloud at or about 8:00 o'clock p.m. on the 27 day of JULY, 1977, in the Conference Room of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT.

Each bid shall be accompanied by cash, or a cashier's check, or a certified check, or bid bond of a surety company licensed to do business in the State of California, in the amount of at least ten percent (10%) of the amount bid, made payable to the order of the Board of Directors of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT, and shall be sealed and filed with the Administrator of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT.

The above-mentioned cash, checks or bid bonds shall be given as a guarantee that the bidder will pay the balance of the amount of his bid if awarded to him, and will be declared forfeited if the successful bidder refuses to accept delivery of the personal property for which he has bid.

The successful bidder shall be responsible for any cartage, freight, haul away, or other charges, and the delivery shall be made to the successful bidder at the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT Hospital.

The Board of Directors of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT reserves the right to reject any and all bids and/or waive any irregularity or informality in the bids or in the bidding.

No bidder may withdraw his bid for a period of thirty (30) days after the date set for the opening thereof.

This is not an official publication. Refer to official notice to bidders published on July 8, 1977 and July 15, 1977 in the Post Dispatch; published in Pittsburg, California.

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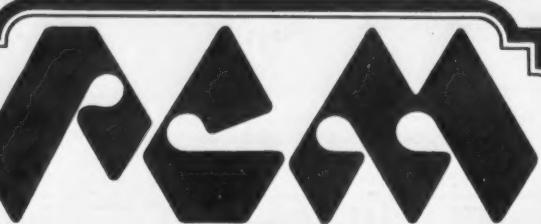
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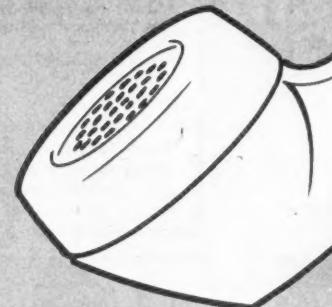
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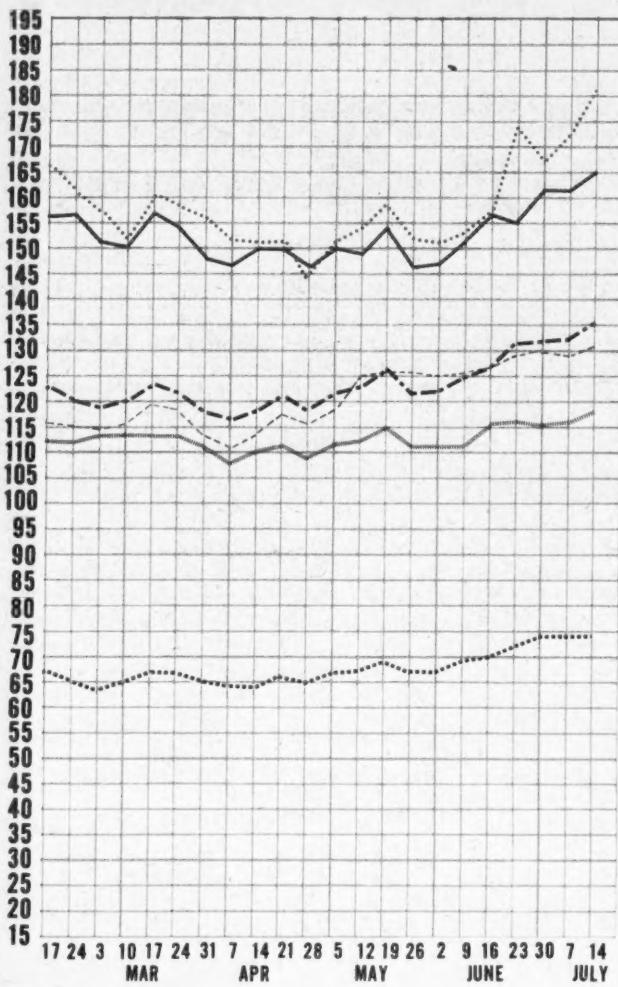
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Earnings Reports

RAYTHEON

Three Months Ended April 30
 1977 1976
 Shr Ernd \$1.50 \$1.18
 Revenue 861,596,000 572,416,000
 Earnings 23,038,000 17,900,000

INFORMATION MAGNETICS

Three Months Ended April 2
 1977 1976
 Shr Ernd \$.21 \$.35
 Revenue 7,786,000 8,170,000
 Tax Cred 30,000
 Earnings 399,000 465,000

KEYDATA

Three Months Ended April 30
 1977 1976
 Shr Ernd \$.05 \$.11
 Revenue 3,667,000 3,801,000
 Earnings 127,000 313,000
 9 Mo Shr .13 .29
 Revenue 10,830,000 11,147,000
 Earnings 348,000 794,000

MICROWAVE ASSOCIATES

Three Months Ended April 2
 1977 1976
 Shr Ernd \$.65 \$.53
 Revenue 16,231,000 15,507,000
 Earnings 990,000 776,000
 6 Mo Shr 1.10 .88
 Revenue 31,289,000 26,616,000
 Earnings 1,666,000 1,282,000

MOHAWK DATA SCIENCES

Year Ended April 30
 1977 1976
 Shr Ernd \$.60 \$1.92
 Revenue 146,057,000 161,672,000
 Tax Cred 1,642,000 2,037,000
 Earnings 4,553,000 13,560,000
 3 Mo Shr .13 1.39
 Revenue 35,146,000 41,026,000
 Earnings 1,010,000 10,178,000

NASHUA

Three Months Ended April 1
 1977 1976
 Shr Ernd \$.60 \$.30
 Revenue 93,779,000 81,998,000
 Earnings 2,780,000 1,400,000

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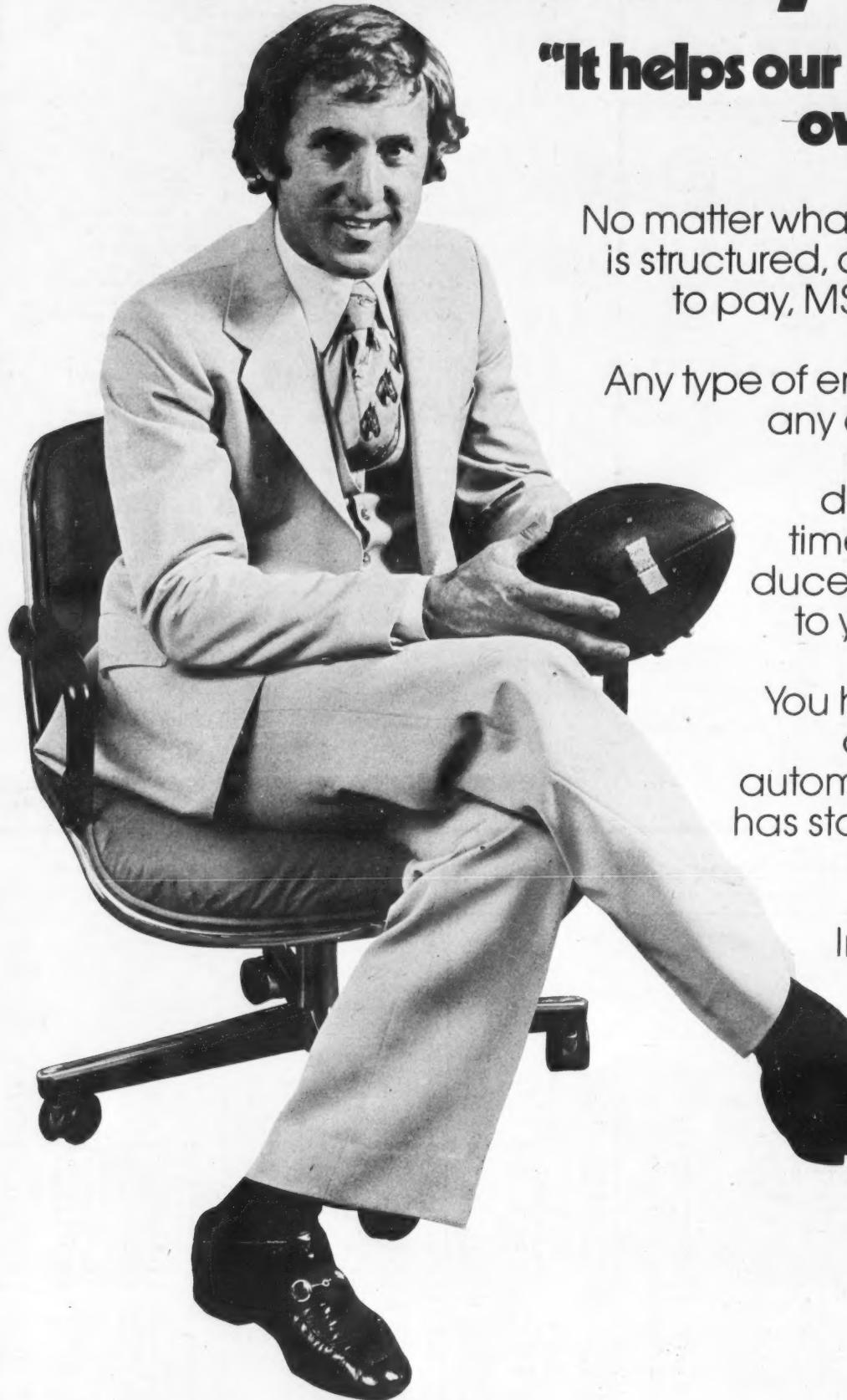
Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 13, 1977

All statistics compiled,
 computed and formatted by
 TRADE★QUOTES, INC.
 Cambridge, Mass. 02139

EXCH	PRICE				EXCH	PRICE				EXCH	PRICE			
	1977 RANGE (1)	CLOSE JUL 13 1977	WEEK CHNGE	WEEK PCT CHNGE		1977 RANGE (1)	CLOSE JUL 13 1977	WEEK CHNGE	WEEK PCT CHNGE		1977 RANGE (1)	CLOSE JUL 13 1977	WEEK CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS														
O Amdahl Corp	0- 39	30 1/4	+\$4	+15.2	O Advanced Comp Tech	1- 2	1	- 1/4	-20.0	O Data Access Systems	4- 5	4	0	0.0
N Burroughs Corp	55- 91	62 1/2	+\$1 1/8	+1.8	O Anacom Inc	7- 9	8 7/8	0	0.0	O Data 100	6- 8	7 3/4	+\$1/4	+3.3
O Computer Automation	18- 28	26 1/2	0	0.0	A Applied Data Res.	5- 9	8 7/8	- 1/8	-1.3	A Data Products Corp	9- 14	14 3/8	+\$1 3/4	+13.8
N Control Data Corp	20- 26	21	+\$1/8	+0.5	N Automatic Data Proc	23- 30	28 1/8	+\$1/8	+0.4	O Data Technology	3- 4	4	0	0.0
N Data General Corp	35- 47	44 3/4	+\$1/2	+1.1	O Coleman American Cos	2- 2	1 3/4	0	0.0	O Datum Inc	1- 2	1 1/2	0	0.0
N Datapoint Corp	18- 30	26 7/8	+\$1 5/8	+6.4	O Comp-Serv Network	10- 15	12	- 1/2	-6.0	O Decision Data Comput	2- 3	2 5/8	+\$1/4	+10.5
N Digital Equipment	37- 53	46	+\$5/8	+1.3	O Comp-Electron Systems	6- 9	9 1/4	0	0.0	N Electronic Data Systems	1- 1	3/8	0	0.0
N Electronic Assoc.	2- 3	2	0	0.0	O Computer Horizons	1- 1	1 1/4	+\$1/4	+25.0	O Fabri-Tek	4- 5	4 1/8	0	0.0
A Electronic Engineer.	8- 10	9 1/8	+\$5/8	+7.3	O Computer Network	6- 7	6 3/8	0	0.0	O General Computer Sys	0- 2	1 1/4	+\$1/8	+11.1
O Four-Phase Systems	13- 17	15 1/4	- 1/8	-0.8	O Computer Sciences	7- 9	8 1/8	0	0.0	N Hazelet Corp	9- 12	10	+\$3/8	+3.8
N Foxboro	42- 54	47 3/8	-3	-5.9	O Computer Task Group	1- 2	1 1/4	0	0.0	A Incoterm Corp	11- 15	10 7/8	- 5/8	-5.4
D General Automation	6- 9	7 5/8	0	0.0	O Computer Usage	1- 3	1 1/2	0	0.0	A Infocom Inc	4- 7	5 3/8	+\$1/8	+2.3
O GRI Computer Corp	1- 1	5/8	0	0.0	O Comshare	5- 7	6 3/4	+\$1 1/4	+22.7	O Information Int'l Inc	9- 14	10 1/4	- 1/4	-2.3
N Hewlett-Packard Co	69- 87	80 1/4	+\$1 1/8	+1.4	O Data Dimensions Inc	4- 5	3 1/2	0	0.0	O Intel Corp	38- 57	48 1/2	+\$1/2	+1.0
N Honeywell Inc	44- 55	54 3/8	+\$5/8	+1.1	O Datatab	1- 2	1 7/8	0	0.0	A Lundy Electronics	3- 6	5 3/8	+\$1/4	+4.8
I IBM	245-286	261 1/8	+\$1 1/4	+0.6	O Electra Corp	16- 20	19 1/4	- 1/4	-1.2	O Msi Data Corp	6- 10	9 1/8	- 3/8	-3.9
O Management Assist	5- 9	6 3/8	+\$1/4	+4.0	O Insyte Corp	2- 3	1 7/8	0	0.0	N Mohawk Data Sci	5- 8	4 7/8	- 1/2	-9.3
O Memorex	23- 29	25 7/8	+\$1/2	+1.9	O Ipsi Computer Market.	1- 2	1 1/2	0	0.0	O Penril Corp	2- 5	4 1/2	0	0.0
O Microdata Corp	7- 18	9 7/8	+\$5/8	+6.7	O Kean Associates	3- 4	3 1/2	+\$1/8	+3.7	A Peritel Corp	7- 9	7 5/8	- 5/8	-7.5
O Modular Computer Sys	5- 8	7 3/4	+\$1/4	+2.3	O Keydata Corp	2- 3	1 7/8	- 1/8	-6.2	O Potter Instrument	2- 2	1 3/4	0	0.0
N NCR	32- 38	36 7/8	+\$1/8	+0.3	O Logicon	7- 17	16	-1	-5.8	O Precision Inst.	2- 2	1 1/2	0	0.0
O Prime Computer Inc	12- 17	17 1/4	+\$1 1/4	+7.8	A Management Data	1- 2	1 1/2	0	0.0	O Quantor Corp	4- 5	3 7/8	+\$1/4	+6.8
N Perkin-Elmer	17- 22	20 5/8	- 1/4	-1.1	A National CSS Inc	19- 25	23 3/8	+\$1 1/2	+6.8	O Recognition Equip	6- 10	9	+\$3/8	+4.3
N Raytheon Co	16- 33	29 7/8	- 1/8	-0.4	O National Data Corp	4- 7	6 1/8	+\$1	+19.5	O Scan Data	1- 2	1 1/2	- 1/8	-11.1
N Sperry Rand	34- 42	35 1/4	- 7/8	-2.4	O On Line Systems Inc	17- 22	18 3/8	+\$3/8	+2.0	O Storage Technology	10- 15	13 3/8	+\$1/2	+3.8
O Sycor Inc	8- 15	10 1/2	- 1/4	-2.3	O Planning Research	3- 5	4 1/2	0	0.0	O T Bar Inc	7- 12	11 5/8	+\$3/4	+6.8
A Systems Eng. Labs	5- 7	7 1/4	0	0.0	O Programming & Sys	1- 1	1 1/2	- 1/8	-20.0	O Tally Corp.	4- 6	4	0	0.0
N Varian Associates	15- 21	19	0	0.0	O Rapidata Inc	2- 3	2 1/2	0	0.0	O TEC Inc	7- 10	8 3/8	- 3/8	-4.2
A Wang Labs.	14- 19	19	+\$2 1/4	+1										

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